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# THE LUMBER INDUSTRY
## A CREDIT ANALYSIS

DONALD DECKER MAGERS

Presented to the Faculty of the Graduate School
in partial fulfillment of the requirements for
the degree of Master of Business Administration.

Philadelphia, 1926.

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# Preface

For the past few years the research division of the Robert Morris Associates of Lansdowne, Pennsylvania, has been making industry studies by developing what they call 'selected' or type ratios. It is the purpose of this paper to develop similar ratios for the lumber industry. For this reason it will be necessary to spend some time at the beginning of the discussion to review methods of statement analysis that are somewhat familiar to the credit man and to make a survey of the industry itself.

The original part of the work is the method used in studying this particular industry. Previous studies have been made of lumber yards and lumber mills but here the industry has been divided into four groups in the following manner:

1. Retail lumber dealers.
2. Wholesale lumber yards.
3. Wholesale lumber dealers without yards or inventory.
4. Retail lumber dealers who also operate a mill work factory.

Select ratios have been developed for each of these groups and several methods have been used to show how these ratios can be used to form an index figure.

In Chapter 5 individual companies are compared to the group to show the importance of group ratios in determining the standing of any one company. Chapter 6 contains a discussion of the business cycle.

In the preparation of this paper the author has been greatly helped by Mr. Alexander Wall and Mr. Ray Duning of the Robert Morris Associates, Lansdowne, Pennsylvania. Both Mr. Wall and Mr. Duning have taken much of their time to help secure statements and to explain methods of statement analysis used by the Robert Morris Associates.

Donald Decker Magers

Philadelphia, Pennsylvania
May 1, 1926

## Chapter 1

## INTRODUCTION

The lumber industry is one of the greatest of all American industries. In order that its magnitude might be fully visualized, figures are given in the Fourteenth Census to show the value of products of establishments in the lumber industry group. In this census, lumber and timber products were valued at $1,393,033,897, while lumber, planing mill products were valued at $500,438,258 and wooden boxes at $177,818,454. There were only two other industries which had more wage earners, the value of products produced ranked ninth. There were 291,367 manufacturing establishments in the United States and of this number there were 26,119 lumber and timber products establishments.

But even without these figures, it is easy for any person to grasp some idea of the size of the industry. For every American industry is dependent upon lumber: in fact the home life of America is dependent upon lumber, for without lumber we could not have our homes.

This particular study has been made in order to show methods that might be used by the lumber dealer to rate a credit risk, and in turn to show his relation to other lumber dealers. But such a study would not be of much benefit unless some background were given to describe lumber, production, distribution, and financial problems. It is with this idea

in mind that the following material is presented.

Lumber Production

In order to grasp the proper concept of lumber production, one must first realize the tremendous amount of lumber that is produced each year in the United States. This idea is very well pointed out by Brown when he states that we produce more than one-half of the total lumber of the world, yet we only export 5 to 7 per cent of our annual production. There are over six hundred different species of trees found in the United States of which sixty are of considerable commercial importance. The principal lumber production since 1890 has been in the southern states, but the great remaining bodies of virgin timber are on the west coast, particularly in the five northwestern states of Oregon, Washington, California, Idaho, and Montana in order of importance. The industry employs over a million men and represents an investment of over fifteen billion dollars. About 80 per cent of the total lumber production is composed of softwoods and the remaing 20 per cent of hardwoods. The southern pine territory has supplied approximately one-third of the total lumber produced. However there is a rapid movement to the West. Southern forests have been heavily taxed with the result that there is a possibility that in a few years they will be able to produce only enough lumber for local needs.

In the past few years there has been an increase in the number of large mills and this condition will be present until the large bodies of virgin forests are cut. There are between 30,000 and 40,000 sawmills in this country. In the year 1919 there were 792 mills each cutting 10,000,000 board feet or more per year. The same census showed 29,534 mills in

the country. In 1923 about 65 per cent of our total lumber production was by a few comparatively large mills.

The above gives some idea of the magnitutde of the industry, but in this paper we are not so much concerned with lumber companies in the producing line, so it will not be necessary to go into further detail in regard to production. However, it will be wise to add that there is a considerable period between the time that lumber is cut and when it is placed upon the market.

## Distribution of the Product

William M. Jardine, Secretary of the Department of Agriculture, recently addressed a meeting of the National-American Wholesale Lumber Association and in the American Lumberman for April 24, 1926 a report is given of this speech in which Mr. Jardine pointed out why the problem of lumber distribution is indeed a serious problem. He pointed out that the mere magnitude of the lumber distribution job is staggering. "More than 50,000,000 tons of lumber a year are carried by the railroads -- a traffic that constitutes nearly 4-1/2 per cent of the total tonnage originated on the railroads and yields over 7 per cent of the total freight revenues."

Several factors can be pointed out which control the distribution of our lumber products. In the first place there are demands in different markets for species having certain properties. One market may want lumber chiefly for construction while another market may use lumber for car building, boxing or crating. Secondly, distribution is controlled by the price at which a satisfactory product can be delivered. This second factor is in turn controlled by production, marketing, transportation costs, and by

the amount of profit which the shipper is willing or is forced to accept on a sale of his goods.

In connection with the problem of distribution it is interesting to note that at the same meeting of the National-American Wholesale Lumber Association referred to above, one speaker made the statement, that out of every dollar paid by the consumer the manufacturer received 43 cents, intimating that the distribution cost was 57 cents.

## Methods of Selling

In Chapter four of this report the lumber industry has been divided into four different groups and an analysis made of each of these groups but to give a background for such a grouping let us look at some of the factors which control sales methods and study such methods in more of a general way.

"Modern lumber manufacturing may be separated into two main divisions, namely, wholesale and retail. Many manufacturers are actively engaged both in the wholesale and the retail trade and, on the other hand, wholesale and retail dealers often are actively interested in the manufacture of products which they sell."(1)

Methods will vary according to the size of the mill. The small mill operator will seldom be able to place his product upon the market directly because he produces such a small amount that the costs would be excessive. This is true because a small operator does not as a general rule ship lumber in carload lots and he cannot compete with the large operator who can ship in carload lots and thus take advantage of lower

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(1) Lumber - R. C. Bryant - page 381.

rates. However, the small mill will make local sales. It is to the advantage of the small operator to use an outside wholesale dealer as outside dealers will often aid in financing the operation. He may also sell his product to another local dealer who will market the output in connection with that of his own plant. Again, he may sell through commission agents or brokers who charge a stated fee per thousand board feet, or per car.

The large operator also uses several different ways to market his product. Many maintain a sales department which handles the output of one mill or a group of mills. This sales office may be located in a large city or may be at the plant. Agencies are often established in large consuming centers. Again, lumber may be sold thru commission agents who have no direct relation to the sales organization.

Large operators also make use of selling agencies or sales exchanges and in order to show in a very clear way the methods used by such agencies and exchanges, the following is quoted from the book "Lumber" by R. C. Bryant, pages 382-383:

> "The exchange represents a group of mills often with interlocking ownership which pool their sales. Such an exchange not only enables mills to reduce their expense by maintaining one sales department, but also to handle orders which individual mills could not fill. This is possible not only because of greater volume of product available, but primarily because orders can be so distributed among member mills that stocks at individual plants can be kept more nearly 'balanced'. Selling agencies also may purchase lumber from manufacturers who are not members of the exchange and offer it for sale together with the product of member mills."

We have seen in a general way how lumber is distributed to the various wholesale dealers but the retail lumber dealer is the ultimate distributor of lumber. Retail dealers distribute about 70 per cent of our

lumber products. They sell in both large and small lots. This is the particular type of dealer which we are most interested in and he will be studied in more detail in the following chapters.

Methods of Financing

In this study we are not much concerned with funded debt as funded debt makes up but a small percentage of the debt of the various groups of companies. We are primarily interested in how the manufacturer, wholesaler and retailer finances his sales and so in order to determine how this is done we must see what terms of sale are customery in each of these three groups.

In the preparation of this section of the report the book by W. H. Steiner, "The Mechanism of Commercial Credit," has been followed. It has been found that manufacturers' terms may in turn be placed into three general classes. The smaller manufacturer will usually call for part cash with his order with the balance to be paid upon arrival of the shipment. A second class of terms are those that are used by large mills and wholesalers and manufacturers of furniture. This is the result of a furniture manufacturer taking the entire supply of some particular mill. The third class of terms are those that are recommended by the manufacturers' association. The usual terms used to be 2 per cent 10 days but due to the fact that the source of lumber supply has been steadily going toward the West, terms for Western dealers had to be lengthened so that Western associations have inserted a clause that permitted cash discount for

payment within five days after arrival of the car. Net terms have been 60 days from date of invoice and in some cases trade acceptances are specified of 90 days.

Wholesalers terms to the retailer call for net cash 60 days from date of invoice, or less 2 per cent if paid within 30 days. Trade acceptances if used are to be for 90 days. There has been a tendency for associations in recent years to advocate the use of trade acceptances.

"Retail lumbermen generally sell on the usual retail terms, and the added expense of carrying their customers for at least a short period of time is included in their selling prices."(1)

Trade Associations

No survey of the American lumber industry would be complete without some mention to the various trade associations which exist thruout the country. One of these associations may be found in each region of the country. They exist for the purpose of bettering marketing conditions of their lumber. The Federal Trade Commission published on February 15, 1922 a report of a study dealing with lumber manufacturers national and regional trade associations. It gave the ten most important regional associations which make up the National Lumber Manufacturers' Association.

These Associations are as follows:

1. Southern Pine Association (manufacturers of southern yellow pine lumber)
2. West Coast Lumbermen's Association (manufacturers of Douglas fir lumber)

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(1) Brown, N. C.-- "The American Lumber Industry"

3. Western Pine Manufacturer's Association (manufacturers of Western White and Yellow pine)
4. Northern Hemlock and Hardwood Manufacturers' Association (manufacturers of hemlock and hard woods in Wisconsin and upper Michigan)
5. Michigan Hardwood Manufacturers' Association (manufacturers of hemlock and hard woods in lower Peninsula of Michigan)
6. Northern Pine Manufacturers' Association (manufacturers of Minnesota and Wisconsin northern pine)
7. North Carolina Pine Association (manufactuers of yellow pine lumber)
8. Georgia-Florida Sawmill Association (manufacturers of yellow pine lumber)
9. Southern Cypress Manufacturers' Association (manufacturers of cypress lumber)
10. California Sugar and White Pine Manufacturers' Association
11. Redwood Manufacturers' Association (manufacturers of California redwood)

As explained these regional associations have formed a national association. Each regional association compiles statistics upon prices and production, the amount of sales and general market conditions and forwards the data to the office of the national association in Chicago, which issues a weekly report. This report appears in practically every financial journal and is watched by all dealers within the industry.

There are also various wholesale and retail lumber associations. The National-American Wholesale Lumber Association is the most representative wholesale association. It represents a combined membership of about 700 firms, is national in its scope, and is truly representative of the industry;

offices are maintained in both New York City and Chicago. The National Retail Lumber Dealer's Association is the most representative association of retail dealers. It also has a very large membership.

Although associations are forbidden to fix prices, it is pretty generally understood by the various members that they will not cut prices. Production is likewise controlled by the various members refusing to place lumber on the market when prices are too low. When it is remembered that in 1918 about 60 per cent of the entire southern yellow pine production was controlled by members of the Southern Pine Association, the significance of the above can be realized. In general, it might be said that the function of these associations is to spread mutually helpful information amongst the various members of their associations. The associations have done much toward the establishment of uniform grading rules, standardization of sizes and methods and inspection services. They also hold conventions at regular intervals and thus keep the men of the industry closely bound together.

## Chapter 2

## STATEMENT ANALYSIS

Statement Analysis as it is known to-day is a development of the last twenty years.(1) In Colonial days and up to a comparatively short time ago, highly organized credit investigating agencies were not in existence. In the Colonial village every merchant knew all the people to whom he sold his merchandise. If a man did not have a high moral standing in the community, and if he had been known to take advantage of his neighbors in a business transaction, it was difficult for him to secure goods unless he paid for them with cash. However, this same situation is present to-day in our rural communities where the village grocer will sell his wares on open book account to those whom he knows will pay when he presents his bill. The president of a country bank will lend money to farmers in his locality because he knows each one personally and knows what each one is worth and whether or not he can pay back his loan. But with the growth of population and the increasing size of the business enterprise this "personal touch" has been lost and consequently a need for credit investigating agencies has developed. Business men and bankers have become familiar with such agencies as Dun's and Bradstreets' which have offices in all important cities and who have listed in their files the names of

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(1) Ratio Method of Statement Analysis and Type Figures -- A bulletin published by the Robert Morris Associates.

practically every business organization in the United States.

> "The two sources of credit information most commonly used by the three great branches of the (lumber) industry are the Blue Book issued by the National Lumber Manufacturers' Credit Corporation of Chicago and designed particularly to meet the needs of the manufacturer by giving the credit ratings and standings of practically all buyers of lumber throughout the country including retail yards, factories, contractors, individual plants, etc., and the Red Book, issued by the Lumberman's Credit Corporation of Chicago and used by both wholesalers and retailers as well as other buyers of lumber and to a large extent by manufacturers as well. Both the Red Book and the Blue Book keep constantly in touch with the local reputation, financial standing, and responsibility of all concerns listed, and furnish information of great value to their subscribers."(1)

## The Three C's of Credit

As mentioned in the above quotation there are three factors which have usually been taken into consideration when analyzing a credit risk. In this study only one of these three factors will be used, but as pointed out by Mr. Alexander Wall of the Robert Morris Associates the other two factors must also necessarily enter into the decision when credit is extended. These three factors have frequently been spoken of as the three C's of Credit, - namely, Character, Capacity and Capital. But in recent years credit men have come to realize that a fourth C should be added and we now speak of the four C's of Credit. This fourth C is the business cycle and it has to do with the periods of prosperity and depression which arise in any industry or group of industries. For example, although it may be a very good policy for a company to have a large percentage of current assets invested in merchandise in a period of rising prices and thus take advantage of a speculative profit due to the rise in prices, it would be best to have a larger proportion of receivables to current assets in a period of falling prices. Let us now discuss in turn each of the

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(1) Brown, N. C. - The American Lumber Industry - page 127.

first two factors before making a detailed study of the third and fourth factors which are probably the most important.

First comes Character which is understood as meaning the moral risk which is involved. If a firm is managed by men whose past is a story of dishonesty and fraud it would not be wise to grant very much credit, even tho the risk should check up in all of the other factors. Bank credit departments will always trace a man's past and loans are often refused by the loaning office because he feels that the moral risk involved is too great. Some credit agencies in New York City make it a business to look up the moral standing of managers and officers whose history might be sought for such use. This surely is an important factor and must always be considered. In this connection may be recalled the well known story told about the man who went into the office of Mr. J. P. Morgan and asked for a loan of one million dollars. The loan was granted as Mr. Morgan said because he had confidence in the Character of the man and he knew that the loan would ultimately be paid. "No statement is better than the man behind it" is an axiom well understood by credit men.(1)

The next factor that must also be considered along with our analysis of the financial statement is Capacity to pay, or the second C of Credit. A firm may be managed by men of high moral standing and may possess adequate capital but it must be remembered that the capacity of the business to earn profits which is its primary function might for numerous reasons be curtailed. A business may be engulfed in the downward swing of a business cycle or may be affected by discoveries in the raw material field. New inventions may make it impossible to compete with enterprises which can

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(1) Ettinger & Golief - Credits and Collections - page 250.

manufacture the same commodity at a much cheaper cost.(1)

The above leads us to a discussion of the third factor "Capital" or the financial strength displayed as pointed out by Mr. Wall. "This is reflected by the amount of assets and liabilities, their various proportions and qualities." By a detailed study of the financial statement the other two factors can often be disclosed. For example, if the company has an unduly large cash balance it may bear investigation as this balance may be the result of what is known as "window dressing."

The Robert Morris Associates gives the weight of 40 per cent, 20 per cent and 40 per cent to threse three factors and so recognizes that each must be taken into consideration.

In recent years there has been an attempt by various credit associations, banks, business houses, accountants and governmental agencies to develop a standard form for the balance sheet and the profit and loss statement so that statements of various companies may be more easily compared. A single financial statement is of very little significance but when this statement is compared with those of previous years or months, important changes may be noted, which may affect the credit standing of the company.

## Requirements for a Financial Statement

In order to later follow out our study of the financial element it will be necessary to discuss briefly some of the requirements for a financial statement. First, the statement must be of a recent date or the statements over a period of years should all be taken off on the same date.

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(1) See Robert Morris Associates Bulletin on Statement Analysis - 1925.

Second, the statements should be taken off at least once a year and if possible every month as changes may be detected easier in this way. Thirdly, it should be an authenticated statement. It should be signed by an officer who has power to sign for the company and should bear the company seal. But above all it should be an audited statement signed by some reputable accounting firm. It is only natural that a man will overvalue his own possessions and so the only reliable method is to call in some reputable auditing concern.(1)

A fourth requirement for the financial statement is that the items listed should be standardized. As mentioned above, much has been done along this line, but there is still much to be done. For this reason the Robert Morris Associates have worked out the following classification of items, a copy of which appears as chart number one in chapter three. The form of the statement is so plain that it would not be of much benefit to discuss each item separately. However some points are explained in chapter three where the actual statement study is conducted.

## The Ratio Method of Statement Analysis

We have noted thus far the tendency for the development of standard statement forms. This has been accompanied by the development of methods of studying the various statements. Perhaps the best method of statement analysis is the ratio method as developed by the Robert Morris Associates under the leadership of Mr. Alexander Wall. Many ratios have been suggested but eight are probably known more than any others. The ratios have been grouped by Mr. Wall into two classes: First the static ratios and secondly the dynamic ratios or in other words those which have

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(1) See W. H. Kniffin, Jr. - Commercial Paper - page 169.

the item of sales for their numerator are called the dynamic ratios as they show a relationship which exists between various items of the balance sheet and sales and may thus be termed dynamic or velocity ratios.

Much has been written concerning these eight ratios so no further explanation will be given here. An excellent discussion of each ratio can be found in Mr. Wall's book "Analytical Credits" and in various bulletins of the Robert Morris Associates.

# Chapter 3

# THE SELECTION OF TYPE RATIOS

## Introduction

In Chapter two we have traced briefly the development of statement analysis. It was noted that during the past ten or twenty years many organizations have cooperated in order to procure what might be termed a standard statement form. But what is of particular interest to us here is the ratio method of analysis that has been described. The eight ratios to be used in this study are those indicated in Chapter two.

## What is a Type Ratio?

The purpose of this chapter is to point out methods by which ratios may be selected which are type ratios for the lumber industry. For many years credit men and bankers have considered that a company should be financially sound if it had a current ratio of 2 to 1. But naturally conditions will vary in different industries, so, that where a 2 to 1 ratio is a satisfactory indicator for credit in one industry, a ratio of 1-1/2 to 1 may be satisfactory in another industry. It is for this reason that the study is made as it is the purpose to develop here such ratios for the lumber industry. Much has been said about a standard current ratio of 2 to 1 but very little has been said as to the standards for the other seven ratios, so it will be equally or even more important to determine the other seven type ratios.

Industry Divided into Four Groups

The Robert Morris Associates have in the past conducted a similar study of the lumber industry but never before has the lumber industry been divided into the four groups used in this report. The classifications are those used by the National Lumber Manufacturers Credit Corporation and are as follows:

1. Retail lumber dealers - "The retail lumber dealer is the ultimate distribution of lumber; it is estimated that 70 per cent of all our lumber products is distributed thru the channels of the retail yards. They sell in both large and small lots and constitute the backbone of the marketing and distributing system."(1)

2. Wholesale lumber yards - There are two types of wholesale lumber dealers and this class is composed of dealers who operate wholesale yards. "Often they buy mill-run lumber at a stated price and regrade and hold it for a rise in prices. They may be interested in companies that control the output of one or several mills. They generally purchase lumber in the rough and resort or work the stock to suit the particular requirements of their customers among the retail yards, factories, etc."(2)

3. Wholesale lumber dealers without yards or inventory - "This other type of wholesaler carries no stock, has no yard, and seldom sees the product which he buys or sells. He may have one or more buying offices in the producing region of the lumber in which he is interested. He knows the conditions at these saw mills intimately -- the size and character of their stocks, and the requirements of his customers with reference to them, and

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(1) The American Lumber Industry - by C. N. Brown, page 112.
(2) The American Lumber Industry - by C. N. Brown, page 115.

often assists financially both the mill operator and the buyer by extending favorable terms. This feature is exceedingly important as large manufacturers seldom deviate from their terms, and a favorable terms clause will often be the deciding issue with the buyer, rather than the price of the stock delivered at his plant or yard."(1)

4. Retail lumber dealers who also operate a millwork factory - Some mills sell only to wholesalers but some mills rather than distribute thru a wholesaler maintain their own sales organizations with the result that we have a large class of small retailers who also operate their own mill-work factory.

## Selecting Comparable Companies

As explained in the preceding paragraphs the industry was first divided into four groups so that in each group there were companies of the same particular type. But in order to make the companies within the group comparable so that ratios selected would mean more, companies of about the same size were selected. In group one in some cases the companies did not sell lumber only but also sold coal, while in a few other cases they also sold hardware. Then again, companies were selected from practially every section of the country so that type ratios would be representative of the whole country. It was for this reason that statements of the Kansas City district were not included in the total as it was thought that they would tend to increase the importance of that section of the country. Statements were used which were taken off between

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(1) The American Lumber Industry - by N. C. Brown - page 115.

November 1, 1925 and January 31, 1926 so the selected ratios are representative of a particular period. If it were possible to get statements for six month periods this would be ideal but it would be impossible to get statements for such periods.

## Method Used to Select the Type Ratios

Most of the statements used were not on the proper forms for analysis so the first step was to place these statements on forms to group the various items so the eight ratios could be easily figured. A copy of this form is here included as Form Number 1. It will be noticed that current assets and current liabilities and other items are grouped and that the ratios can thus be more quickly found.

Most of the items need no further explanation but as practices vary so much among credit men it will be best to explain how some items were classed. Where goodwill appeared it was deducted from the total of both assets and liabilities. On the asset side space is provided for goodwill altho it was not included in the total, but on the liability side it was deducted from net worth. Treasury stock was treated in the same manner. Where a depreciation reserve appeared it was carried as a reserve and not deducted from fixed assets and the statement readjusted as is so often done. Other items were treated in the usual manner.

But the most interesting feature of this form appears at the bottom where space is provided for the eight ratios of the particular name and the eight type ratios. This affords a method of comparing the individual company with the group. Such a comparison is made in Chapter 5.

r No................ Form Number One. Member.........Type.........

you to identify your subject. These numbers for office use only.

# ROBERT MORRIS ASSOCIATES

## Industry Study

PE OF BUSINESS..........................................................................................

ME ........................................................................................................

If you do not wish to indicate the name of the company whose statement you submit, you can key statement by inserting a number at the upper left hand corner of the sheet. The upper right hand er is our key to identify the reporting bank and it is not necessary for you to indicate your name in way.

Please be sure to submit figures only on such industries as indicated on the list accompanying this ı, and only with dates ranging between November 1, 1925 and January 31, 1926.

**Fill Out in Dollars—Adjusting Cents**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| a | | | | Payables | | | |
| ivables | | | | Taxes | | | |
| :handise | | | | Miscellaneous Current | | | |
| ernment Securities | | | | Total Current | | | |
| ellaneous Current | | | | Funded Debt | | | |
| otal Current | | | | | | | |
| t and Equipment | | | | Total Debt | | | |
| Other Slow Assets | | | | Reserves | | | |
| otal Non-Current | | | | | | | |
| dwill | | | | Capital Stock | | | |
| asury Stock | | | | Surplus | | | |
| | | | | Net Worth | | | |
| Total | | | | Total | | | |

les for year ending with this statement $

The following information will be computed in the Central Office and returned to you for your

| RATIOS THIS NAME | | SELECTED RATIOS | |
|---|---|---|---|
| ent | | Current | |
| e.-Rec. | | Mdse.-Rec. | |
| th-Fixed | | Worth-Fixed | |
| th-Debt | | Worth-Debt | |
| -Rec. | | Sales-Rec. | |
| -Mdse. | | Sales-Mdse. | |
| -Fixed | | Sales-Fixed | |
| -Worth | | Sales-Worth | |

After ratios had been worked the next step was to copy each statement on a grouping sheet. This sheet was ruled off into columns, the head of each column being an item of the statement. This was done for each of the groups. Each of the columns was then totaled and this gave a combined statement. Ratios were for the combined items.

These combined statements for each of the four groups have been prepared and are included in this report. But to better show the proportions of the various items within each combined statement, they have also been presented as 100 per cent statements. "The 100 per cent statement was developed by dividing each item on the balance sheet by the total to find what percentage each item bore to the total."(1) It can easily be seen that such a statement is of much more benefit than the ordinary dollar statement. The 100 per cent statement is of particular value when comparing a single company with the group such as has been done in Chapter 4. It also makes it easier to compare combined statements of the various groups. For example, by glancing at the 100 per cent statements we can see how much cash will be expected of a certain company in each group.(2) Statements presented in this way show in percentage form, relations, which are later brought out by the ratios.

The ratios of the individual statements were assembled upon a modal sheet, one sheet being used for each of the ratios for each division of the industry. One of these sheets is shown as form number 1. As some of the ratios will vary more than others, it was necessary to divide the sheet differently for the eight ratios. The current ratios which should not vary

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(1) R. V. Duning - Barometric Analysis of Credit.
(2) Dollar and 100% for each group are given in tables at the end of this chapter.

so much were placed on the sheet where the columns were only 25 per cent apart. This was also true of the merchandise- receivables ratio and the worth-debt ratio while the worth-fixed ratios were 50 per cent apart. All sales ratios were placed in columns divided into hundreds.

Due to lack of space it was thought best not to include each modal sheet in this report so a summary was prepared. This summary is given in tables which are numbered 15, 16 and 17. The total of each column is given. For example a column headed 150 might contain six ratios such as 150, 155, 159, 165, 174 and 168 which would be summarized is being six in column 150. As some ratios were put on sheets with the same column headings these ratios were grouped together. It was for this reason that the current, merchandise-receivables and worth-debt ratios and the ratios containing sales were grouped together.

Although this method does not give each ratio separately it is very valuable to the discussion as one can glance at the table and see the distribution of ratios and determine whether or not the mode is clearly defined. The purpose of this sheet was to find the mode and the median ratios. By the mode is meant the ratio which appears most frequently or the "most fashionable" ratio. It was found by taking an arithmetic average of the column which contained the most ratios as this column is the focal wolumn. In Table No. 1 it can easily be seen that the mode would be found by taking an arithmetic average of the column of ratios headed 300. But all of the modes were not so clearly defined and in some instances it was impossible to determine the mode. In some there was

a bimodal distribution. By a bimodal distribution is meant that there are two places around which ratios are grouped. Such a distribution was found for example when the worth-debt ratio of group number one were assembled.

The median is that item which is exactly in the middle when the items are arranged consecutively. When the number of items is even, it is halfway between the two middle terms; when the number is odd, it is the middle term. The formula $\frac{N+1}{2}$ was used to locate the median. In Chart Number 2 on page there are 50 ratios so the median would be the 25.5 ratio.

The median was thus found by taking one half the difference between the 25th and the 26th ratios which were 381 and 407 respectively and adding the result (1/2 of 26 = 13) to the 25th ratio 381. This gave the median ratio of 394.

"The reason for using the mode and median as factors in arrivin at a selected ratio is that they do not give weight to the size of the statement. The ratios of the smaller companies have just as much weight in the determination of the mode and median as have the ratios of the larger ones. In the packing business, for example, there are a few very large companies which determine to a great extent the arithmetic proportions."(1)

We now see that there have been three different ratios selected. The first was obtained from the combined statements, the second is the mode

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(1) Ratio Method of Statement Analysis and Type Figures — a bulletin published by the Robert Morris Associates - 1925.

## Table Number One --- Modal Sheet

### Sales - Merchandise Ratio --- Retail Lumber Dealer

| 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | Over 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 245 | 312 | 407 | 530 | 631 | 779 | 862 |  | 1049 | 1152 |  | 1943 |
| 204 | 318 | 419 | 576 | 654 | 798 | 801 |  |  |  |  | 1941 |
| 259 | 321 | 453 | 513 | 638 | 723 |  |  |  |  |  |  |
| 224 | 331 | 459 | 536 |  | 737 |  |  |  |  |  |  |
| 211 | 332 | 484 | 524 |  |  |  |  |  |  |  |  |
| 242 | 333 | 487 | 565 |  |  |  |  |  |  |  |  |
| 287 | 334 |  |  |  |  |  |  |  |  |  |  |
| 223 | 342 |  |  |  |  |  |  |  |  |  |  |
| 256 | 347 |  |  |  |  |  |  |  |  |  |  |
|  | 359 |  |  |  |  |  |  |  |  |  |  |
|  | 364 |  |  |  |  |  |  |  |  |  |  |
|  | 381 |  |  |  |  |  |  |  |  |  |  |

Median = 25.5th ratio = 394

Mode = Average of column 3 = 339

and the third is the median of the ratios of the individual statements. These three ratios have been set up in a tables which ~~is~~ and seen on pages 28 & 29. To get the final type ratio an arithmetic average was taken of these three ratios.

We have condensed our work so that we now have one set of ratios for each of the four divisions of the industry. Tables are given below which show the type ratios obtained for each of these groups.

Table No. 2

Selection Tables for Lumber Dealers

Group No. 1 — Retail Lumber Dealers

1925

50 names

| | Arith. | Mode | Median | Total | Average |
|---|---|---|---|---|---|
| Current | 409 | 309 | 394 | 1112 | 372 |
| Mdse.-Rec. | 116 | 88 | 122 | 326 | 109 |
| Worth-Fixed | 290 | 320 | 311 | 921 | 307 |
| Worth-Debt | 416 | | 363 | 779 | 389 |
| Sales-Rec. | 485 | 456 | 508 | 1449 | 483 |
| Sales-Mdse. | 417 | 339 | 394 | 1150 | 381 |
| Sales-Fixed | 559 | 490 | 615 | 1664 | 555 |
| Sales-Worth | 192 | 151 | 186 | 529 | 176 |

## Table No. 3

### Group No. 2 — Wholesale Lumber Yards

1925 - 11 names

| | Arith. | Mode | Median | Total | Average |
|---|---|---|---|---|---|
| Current | 261 | | 215 | 496 | 248 |
| Mdse.-Rec. | 179 | | 178 | 357 | 178 |
| Worth-Fixed | 280 | 181 | 143 | 554 | 185 |
| Worth-Debt | 194 | | 130 | 324 | 162 |
| Sales-Rec. | 740 | | 786 | 1526 | 763 |
| Sales-Mdse. | 412 | 528 | 540 | 1460 | 493 |
| Sales-Fixed | 834 | | 739 | 1573 | 786 |
| Sales-Worth | 297 | 249 | 261 | 807 | 269 |

## Table No. 4

### Group No. 3 — Wholesale Lumber Dealers Without Yards or Inventory

1925 - 17 names

| | Arith. | Median | Total | Average |
|---|---|---|---|---|
| Current | 216 | 224 | 440 | 220 |
| Mdse.-Rec. | | | | |
| Worth-Fixed | 361 | 898 | 1259 | 629 |
| Worth-Debt | 153 | 281 | 434 | 217 |
| Sales-Rec. | 614 | 597 | 1211 | 605 |
| Sales-Mdse. | | | | |
| Sales-Fixed | | | | |
| Sales-Worth | 761 | 840 | 1601 | 800 |

## Table No. 5

Group No. 4 -- Retail Lumber Dealers who Operate millwork factories also

1925 - 50 names

| | Arith. | Mode | Median | Total | Average |
|---|---|---|---|---|---|
| Current | 264 | 163 | 298 | 725 | 242 |
| Mdse.-Rec. | 77 | 87 | 103 | 267 | 89 |
| Worth-Fixed | 208 | 175 | 235 | 618 | 206 |
| Worth-Debt | 248 | 115 | 336 | 699 | 233 |
| Sales-Rec. | 457 | 443 | 482 | 1382 | 461 |
| Sales-Mdse. | 586 | 467 | 419 | 1472 | 491 |
| Sales-Fixed | 484 | 356 | 431 | 1271 | 424 |
| Sales-Worth | 232 | 235 | 207 | 674 | 225 |

These four selection tables contain standard ratios for each division of the lumber industry for the year 1925. It was pointed out in the beginning of this chapter that a ratio was affected by the nature of the business and that it would be unfair to say that a company was in a poor condition financially merely because its current ratio fell below 200. It was with this purpose in mind that the study was made and in order to see if our previous statement was correct, let us examine the tables closely.

The best comparison can be made between group number one and group number four, as each of these groups contain the same number of statements. It is interesting to note that the current ratio of group number one is much larger than the current ratio of group number four. Our ratios point out the different but to understand the situation better, let us turn and

look at our 100 per cent statement and see if it throws more light upon the problem. It will be noticed that current assets make up 72.79% of group number one and 66.75% of number four. This is caused by a higher percentage of merchandise in group number one. Upon the current liabilities side of the balance sheet, the situation is further explained for here it will be noticed that payables make up only 16.40% of total liabilities in group number one but that they make up 23.09% of group number four. Yet when the nature of the business is considered the above facts would be expected. In the first place, a company which deals only in retail lumber would naturally have more money tied up in inventory in comparison to total assets than would a retail lumber dealer who also runs a mill-work factory, as a good part of his capital would be invested in fixed assets. Such is the case, for fixed assets in number one amount to only 27.21% while in number four they amount to 33.25%. And again, a retail lumber dealer will not turn his inventory as rapidly as a retail lumber dealer who also operates a mill-work factory and this conclusion is substantiated for our sales-merchandise ratio in group one, which is only 381, while in group four it is 491.

So it has been clearly pointed out by these ratios that they are affected by the nature of the business and consequently if type ratios are to be used as a base to compare an individual company to a group, the group must be composed of companies in the same line of business. It is also as important that the individual company be of the same nature as companies in the group. Then and only then will type ratios accurately represent the condition of any one individual company which is being checked.

## Table No. 6

Total 128 Statements --- 1925

| | Arith. | Mode | Median | Total | Average |
|---|---|---|---|---|---|
| Current | 290 | | 327 | 617 | 308 |
| Mdse.-Rec. | 76 | 88 | 105 | 269 | 89 |
| Worth-Fixed | 252 | 177 | 281 | 710 | 237 |
| Worth-Debt | 262 | 115 | 325 | 702 | 234 |
| Sales-Rec. | 524 | 531 | 497 | 1552 | 517 |
| Sales-Mdse. | 687 | 342 | 486 | 1515 | 505 |
| Sales-Fixed | 712 | 442 | 521 | 1675 | 558 |
| Sales-Worth | 282 | 196 | 240 | 718 | 237 |

This table, showing ratios obtained by combining all 128 statements into one group, was prepared so as to afford a means of comparing each group to the total. The eight ratios check up very well with what we have previously seen and show us very conclusively that the various ratios are affected by the nature of the business. Let us for example compare group number three to the total. This group consists of wholesale dealers without yards or inventory and consequently the current ratio will be much lower as such companies have no inventory and will have a small amount of current assets in comparison to current liabilities. So first of all we can see that the current ratio would not be a fair ratio to select for comparison with companies in group number three. But let us look at the other ratios and see if they will also bear out this same conclusion. We notice that the dollar statement shows practically no inventory and so no mdse.rec. ratio

was worked for group three. Group three has been responsible for pulling this ratio to the low mark of 69 which is unfair to companies in other groups. The worth-fixed ratio is also uncomparable, for companies in this group would not be expected to have much money invested in fixed assets. The worth-debt ratio and the sales-rec. ratios check up pretty well. We would not expect much difference in these ratios as they should be about the same in each group. But due to the fact that it is a commission business the sales-worth ratio will be high for it will be possible to make more sales on a smaller capital investment. So we have seen that in practically every case the ratiosof the total statement are not representative of group three and that for this reason group three statements have influenced the total group ratios so that they will not accurately portray conditions for any other group. But this will have to be qualified some as groups one and four make up 100 of the 128 statements, so the group figures would be more nearly correct for these two groups.

The Kansas City District

Seven statements were obtained for a period of three years of companies in the district in and around Kansas City. These statements are spoken of as statements from the Kansas City district. As explained above, the seven statements were not included in group one figures for the year 1925 as it would give weight to one section of the country to include them in the total. The same method was used to find the arithmetic and median averages but as only seven statements were used there was no mode distinguishable so an average of the first two was made to find the type ratio. This district has been compared to group one figures in chapter number four. A combined dollar and 100% statement was prepared

and is also discussed in chapter number four. The selection table for the district is given below.

## Table No. 7

### Kansas City District

### Retail Lumber Dealers — 7 statements

### Selection Table

—1923—

| | Arith. | Median | Total | Average |
|---|---|---|---|---|
| Current | 379 | 345 | 724 | 362 |
| Mdse.-Rec. | 189 | 184 | 373 | 186 |
| Worth-Fixed | 266 | 295 | 561 | 280 |
| Worth-Debt | 437 | 399 | 836 | 418 |
| Sales-Rec. | 645 | 606 | 1251 | 625 |
| Sales-Mdse. | 340 | 267 | 607 | 303 |
| Sales-Fixed | 485 | 518 | 1003 | 501 |
| Sales-Worth | 182 | 172 | 354 | 177 |

—1924— (6 cos.)

| | Arith. | Median | Total | Average |
|---|---|---|---|---|
| Current | 385 | 431 | 816 | 408 |
| Mdse.-Rec. | 173 | 160 | 333 | 166 |
| Worth-Fixed | 282 | 332 | 620 | 310 |
| Worth-Debt | 442 | 436 | 878 | 439 |
| Sales-Rec. | 511 | 453 | 964 | 482 |
| Sales-Mdse. | 294 | 254 | 548 | 274 |
| Sales-Fixed | 440 | 416 | 856 | 428 |
| Sales-Worth | 155 | 133 | 288 | 144 |

—1925—

| | Arith. | Median | Total | Average |
|---|---|---|---|---|
| Current | 471 | 439 | 910 | 455 |
| Mdse.-Rec. | 165 | 146 | 311 | 155 |
| Worth-Fixed | 274 | 281 | 555 | 277 |
| Worth-Debt | 585 | 570 | 1155 | 577 |
| Sales-Rec. | 578 | 536 | 1114 | 557 |
| Sales-Mdse. | 348 | 424 | 772 | 386 |
| Sales-Fixed | 463 | 440 | 903 | 451 |
| Sales-Worth | 168 | 156 | 324 | 162 |

## Table No. 8

### Group Number 1 -- Dollar Statement

--1925--

| | | Dollar Statement | 100% Statement |
|---|---|---|---|
| Cash | | 382,410 | 4.93 |
| Receivables | | 2,431,501 | 31.37 |
| Merchandise | | 2,827,310 | 36.48 |
| Government Bonds | | 700 | |
| Miscellaneous | | 107 | |
| Total Current | | 5,642,028 | 72.79 |
| Total Fixed | | 2,108,674 | 27.21 |
| Total | | 7,750,702 | 100.00% |
| Payables | | 1,271,219 | 16.40 |
| Taxes | | 11,846 | .15 |
| Miscellaneous | | 95,729 | 1.23 |
| Total current | | 1,378,794 | 17.78 |
| Funded | | 91,295 | 1.18 |
| Total debt | | 1,470,089 | 18.96 |
| Reserves | | 154,994 | 2.00 |
| Net Worth | | 6,125,619 | 79.04 |
| Total | | 7,750,702 | 100.00% |
| Sales | 11,800,435 | | 151.77% |

## Table No. 9

### Group Number 2 — 1925

| | Dollar Statement | 100% Statement |
|---|---|---|
| Cash | 83,578 | 3.55 |
| Receivables | 609,864 | 25.91 |
| Merchandise | 1,094,166 | 46.48 |
| Government bonds | 25,000 | 1.06 |
| Total current | 1,812,608 | 77.00 |
| Total Fixed | 541,257 | 23.00 |
| Total | 2,353,865 | 100.00 |
| Payables | 544,094 | 23.11 |
| Taxes | 26,513 | 1.13 |
| Miscellaneous | 73,738 | 3.13 |
| Total Current | 644,345 | 27.37 |
| Funded | 137,775 | 5.85 |
| Total Debt | 782,120 | 33.22 |
| Reserves | 30,521 | 1.30 |
| Net worth | 1,541,224 | 65.48 |
| Total | 2,353,865 | 100.00% |
| Sales | 4,516,507 | 191.87% |

## Table No. 10

### Group Number 3 -- 1925

| | | Dollar Statement | 100% Statement |
|---|---|---|---|
| Cash | | 207,458 | 6.56 |
| Receivables | | 2,327,235 | 73.61 |
| Merchandise | | 106,796 | 3.38 |
| | Total current | 2,641,489 | 83.55 |
| | Total Fixed | 519,931 | 16.45 |
| | Total | 3,161,420 | 100.00 |
| Payables | | 953,821 | 30.17 |
| Taxes | | 450 | |
| Miscellaneous | | 266,764 | 8.44 |
| | Total Current | 1,221,035 | 38.61 |
| Funded | | | |
| | Total Debt | 1,221,035 | 38.61 |
| Reserves | | 60,591 | 1.92 |
| Net Worth | | 1,879,794 | 59.47 |
| | Total | 3,161,420 | 100.00 |
| | Sales | 14,311,798 | 453% |

## Table No. 11

### Group Number 4 — 1925

| | | Dollar Statement | 100% Statement |
|---|---|---|---|
| Cash | | 411,204 | 3.88 |
| Receivables | | 3,744,787 | 35.27 |
| Merchandise | | 2,919,134 | 27.50 |
| Government bonds | | 10,850 | .10 |
| Total Current | | 7,085,975 | 66.75 |
| Total Fixed | | 3,530,726 | 33.25 |
| Total | | 10,616,701 | 100.00% |
| Payables | | 2,451,347 | 23.09 |
| Taxes | | 28,605 | .27 |
| Miscellaneous | | 197,538 | 1.86 |
| Total Current | | 2,677,490 | 25.22 |
| Funded | | 290,628 | 2.74 |
| Total Debt | | 2,968,118 | 27.96 |
| Reserves | | 286,118 | 2.69 |
| Net Worth | | 7,362,465 | 69.35 |
| Total | | 10,616,701 | 100.00% |
| Sales | 17,121,772 | | 161.27% |

## Table No. 12

### Total 128 Statements for 1925

| | | Dollar Statement | 100% Statement |
|---|---|---|---|
| Cash | | 1,084,650 | 4.54 |
| Receivables | | 9,113,387 | 38.15 |
| Merchandise | | 6,947,406 | 29.09 |
| Government Bonds | | 36,550 | .16 |
| Miscellaneous | | 107 | |
| Total Current | | 17,182,100 | 71.94 |
| Total Fixed | | 6,700,588 | 28.06 |
| Total | | 23,882,688 | 100.00% |
| Payables | | 5,220,461 | 21.86 |
| Taxes | | 67,414 | .28 |
| Miscellaneous | | 633,769 | 2.65 |
| Total Current | | 5,921,664 | 24.79 |
| Funded | | 519,698 | 2.18 |
| Total Debt | | 6,441,362 | 26.97 |
| Reserves | | 532,224 | 2.23 |
| Net Worth | | 16,909,102 | 70.80 |
| Total | | 23,882,688 | 100.00% |
| Sales | 47,750,512 | | 199.9% |

## Table No. 13

## Kansas City District

Dollar Statement

| | 1923 | 1924 (6 cos.) | 1925 |
|---|---|---|---|
| Cash | 101,876 | 103,995 | 87,634 |
| Receivables | 782,194 | 839,470 | 858,270 |
| Merchandise | 1,482,401 | 1,460,110 | 1,424,406 |
| Total Current | 2,366,471 | 2,403,575 | 2,370,310 |
| Total Fixed | 1,039,650 | 974,689 | 1,071,633 |
| Total | 3,400,121 | 3,378,264 | 3,441,943 |
| Payables | 566,832 | 599,259 | 477,769 |
| Taxes | 27,992 | 23,721 | 23,146 |
| Miscellaneous | 29,406 | | 1,466 |
| Total Current | 624,230 | 622,980 | 502,381 |
| Funded | 9,473 | | |
| Total Debt | 633,703 | 622,980 | 502,381 |
| Net Worth | 2,772,418 | 2,755,284 | 2,939,562 |
| Total | 3,406,121 | 3,378,204 | 3,441,743 |
| Sales | 5,050,622 | 4,293,446 | 4,964,696 |

## Table No. 14

## Kansas City District

100% State-
ment

| | 1923 | 1924 (6 cos.) | 1925 |
|---|---|---|---|
| Cash | 2.59 | 3.09 | 2.54 |
| Receivables | 22.96 | 24.85 | 24.93 |
| Merchandise | 43.92 | 43.22 | 41.39 |
| Total Current | 69.47 | 71.15 | 68.86 |
| Total Fixed | 30.53 | 28.85 | 31.14 |
| Total | 100.00 | 100.00 | 100.00 |
| Payables | 16.64 | 17.74 | 13.88 |
| Taxes | .82 | .70 | .67 |
| Miscellaneous | .86 | | .04 |
| Total Current | 18.32 | 18.44 | 14.59 |
| Funded | .28 | | |
| Total Debt | 18.60 | 18.44 | 14.59 |
| Net Worth | 81.40 | 81.56 | 85.41 |
| Total | 100.00 | 100.00 | 100.00 |
| Sales | 148.28% | 127.09% | 144.24% |

## Table No. 15

## Modal Table

| olumn eadings | Current Ratio 1 | 2 | 3 | 4 | Total | Mdse.-Rec. 1 | 2 | 3 | 4 | Total | Worth-Debt 1 | 2 | 3 | 4 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | | | | | | | |
| 25 | | | | | | 3 | | | 9 | 13 | | 2 | 3 | 1 | 6 |
| 0 | | | | | | 5 | 1 | | 4 | 10 | | 1 | 2 | 1 | 4 |
| 75 | | | | | | 12 | | | 12 | 24 | 1 | 0 | 0 | 1 | 2 |
| 00 | 1 | 1 | 1 | 5 | 8 | 7 | 2 | | 9 | 18 | 2 | 2 | 2 | 8 | 14 |
| 25 | 1 | 2 | 3 | 1 | 7 | 4 | | | 7 | 11 | 0 | 1 | 1 | 3 | 5 |
| 50 | | 2 | 2 | 5 | 9 | 2 | 2 | | 2 | 6 | 1 | 1 | | 2 | 4 |
| 75 | 2 | | 1 | 3 | 6 | 6 | 1 | | 2 | 9 | 3 | 1 | | | 4 |
| 00 | 1 | 1 | 3 | 3 | 8 | 4 | 2 | | | 6 | 2 | | | 2 | 4 |
| 25 | 4 | | 1 | 2 | 7 | 1 | | | | 1 | 1 | | | | 1 |
| 50 | 2 | 1 | | 3 | 6 | | | | | 0 | 4 | | | 4 | 8 |
| 75 | 3 | | | 2 | 5 | 1 | | | 1 | 2 | 2 | | 2 | 1 | 5 |
| 00 | 5 | | | 2 | 7 | | | | 1 | 1 | 4 | | 1 | | 5 |
| 25 | 3 | | | 1 | 4 | | | | | 0 | 3 | | 1 | 1 | 5 |
| 50 | 2 | | 1 | 1 | 4 | | | | | 0 | 3 | | | 2 | 5 |
| 75 | 1 | 1 | 2 | 3 | 7 | | 1 | | | 1 | | 1 | | | 1 |
| 00 | 3 | | | 2 | 5 | 1 | 0 | | | 1 | | | | | |
| ver 00 | 22 | 3 | 3 | 15 | 43 | 4 | 1 | | 3 | 8 | 24 | 3 | 4 | 21 | 52 |

## Table No. 16

### Modal Table

### North - Fixed

| lum: ading | 1 | 2 | 3 | 4 | Total |
|---|---|---|---|---|---|
| 0 | | | | | |
| 50 | | 1 | 1 | 1 | 3 |
| 100 | 4 | 5 | | 9 | 18 |
| 150 | 5 | | 1 | 12 | 18 |
| 200 | 6 | | | 5 | 11 |
| 250 | 7 | 1 | | 7 | 15 |
| 300 | 8 | 1 | | 3 | 12 |
| 350 | 6 | | | 1 | 7 |
| 400 | 2 | | | 5 | 7 |
| 450 | 1 | | | 2 | 3 |
| 500 | 3 | | | | 3 |
| 550 | 4 | | 1 | 2 | 7 |
| 600 | 1 | | 1 | | 2 |
| 650 | | | | | 0 |
| 700 | | | | 1 | 1 |
| 750 | 1 | | 1 | 1 | 3 |
| ver | 2 | 2 | 7 | 1 | 12 |
| | | | Total | | 128 |

## Table No. 17

## Modal Table

| Column Headings | Sales—Rec. 1 | 2 | 3 | 4 | Total | Sales—Mdse. 1 | 2 | 3 | 4 | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | | |
| 100 | 1 | | 1 | 1 | 3 | 4 | 1 | | 1 | 6 |
| 200 | 3 | | 1 | 7 | 11 | 9 | | | 5 | 14 |
| 300 | 9 | | 0 | 7 | 16 | 12 | 2 | | 8 | 22 |
| 400 | 10 | | 3 | 12 | 25 | 6 | | | 11 | 17 |
| 500 | 8 | 3 | 4 | 10 | 25 | 6 | 3 | | 8 | 17 |
| 600 | 5 | | 3 | 6 | 14 | 3 | 1 | | 6 | 10 |
| 700 | 3 | 3 | | 5 | 11 | 4 | | | 1 | 5 |
| 800 | 4 | 1 | 1 | | 6 | 2 | 1 | | 3 | 6 |
| 900 | 3 | | 2 | | 5 | | | | 1 | 1 |
| 1000 | 1 | 2 | 1 | 1 | 5 | 1 | 1 | | 2 | 4 |
| 1100 | | 1 | 1 | | 2 | 1 | 1 | | 2 | 4 |
| 1200 | | | | 1 | 1 | | | | 1 | 1 |
| 1300 | | | | | | | | | 1 | 1 |
| 1400 | | 1 | | | 1 | | | | | |
| 1500 | | | | | | | | | | |
| Over | 3 | | | | 3 | 2 | | | | 2 |
| | | | | | 128 | | | | | 128 |

| Sales—Fixed | | | | | Sales—Worth | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | Total | 1 | 2 | 3 | 4 | Total |
| 1 | | | 1 | 2 | 6 | | | 4 | 10 |
| 2 | | | 2 | 4 | 21 | 2 | 1 | 17 | 41 |
| 2 | 1 | | 8 | 11 | 11 | 4 | | 21 | 36 |
| 2 | 1 | | 11 | 14 | 8 | 1 | 1 | 4 | 14 |
| 9 | 1 | | 8 | 18 | 3 | 1 | 1 | 1 | 6 |
| 8 | | | 4 | 12 | | | 1 | 1 | 2 |
| 5 | 1 | | 2 | 8 | | 1 | 1 | 1 | 3 |
| 6 | | | 6 | 12 | 1 | | 1 | 1 | 3 |
| 3 | 1 | | 1 | 5 | | | 4 | | 4 |
| 3 | 1 | | 1 | 5 | | 2 | 1 | | 3 |
| 2 | 1 | | | 3 | | | | | |
| 1 | | | 1 | 2 | | | 2 | | 2 |
| | | | 1 | 1 | | | 2 | | 2 |
| | | | 1 | 1 | | | | | |
| 6 | 1 | | 3 | 10 | | | 2 | | 2 |
| | | | | 128 | | | | | 128 |

# CHAPTER IV.

## A [illegible].

[illegible]

## A CREDIT INDEX.

INTRODUCTION: So far we have been concerned with the preparation of 100% statements and with the selection of type ratios but in order to better represent the credit position of various groups within this industry a figure will be selected which can be used in place of the eight ratios. This figure will be called our index figure. The method used by Mr. Wall to secure the index of a particular company as compared with the total will be taken up in Chapter Five.

THE INDEX EXPLAINED: We have worked out for each group a set of ratios each of which is the type ratio for its particular group. In order to get one figure which represents the eight ratios several different methods were used. The first method was to use a weighted geometric average. The main objection to this method of procedure is that the geometric average is not understood by many business men. For this reason the following is quoted from R. Riegel's book on Business Statistics - pages 250-252.

> "The geometric average is the Nth root of the product of N items, a definition more complicated in sound than in fact. If, for example, there are five items, the geometric average is found by multiplying together the five items and extracting the 5th root of the product. Similarly for a group of six items the geometric average is the 6th root of the product of the six items. Expressed as a formula: G. A. = $^n$ x.xx$_2$xx$_3$ --- xx$_3$
> But continuous multiplication where the items are numerous results in very

> large products and extraction of high roots and the labor is greatly reduced by the use of logarithms ---- The arithmetic average is such a figure that, if it were substituted for each of the original items the sum of the items would remain the same. The Geometric Average is such a figure that, if it were substituted for each of the original items, the product of the items would remain the same. ---- The product of the ratios above the geometric average is equal to the product of the ratios of the geometric average to the items below the geometric average."

> "The geometric average is an average of ratios, each item being important in proportion to its relation to the geometric average rather than to the absolute amount by which it differs from the arithmetic average. Where used in connection with ratios, therefore, the geometric average gives a consistency in results unattainable by any other type."(1)

ASSIGNMENT OF WEIGHTS: The assignment of weights has been purely arbitrary. The weights assigned are those that are used by the Robert Morris Association in practically all of their industry studies. Some explanation may be demanded at this point as some will question the right to say that one ratio is more valuable than another.

The first thing to consider is the current position of a company and so the current ratio is given a weight of 25%.

> "No weight is given the merchandise receivable ratio in any analysis as the value of this ratio in different periods of the business cycle is sometimes inverted. In a period of rising prices it is an advantage to have the preponderance of current assets in merchandise in order that one

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(1) R. Riegel - Business Statistics - page 262.

> might take advantage of a speculative profit due to this rise. However, in a period of declining prices it is better to have the preponderance in receivable."(1)

The other ratio besides the current ratio which has been a weight of 25% is the Worth-Debt ratio and the reason for this is because a law Worth-Debt ratio is a serious condition as it means that the company is becoming loaded up with borrowed funds and fixed charges. The same situation is true in regard to the Worth-Fixed ratio as a falling worth-fixed ratio indicates a decreasing interest in fixed assets such as machinery and equipment that are necessary to run the business. Sales ratios are given a weight of only 15 [illegible] as [illegible] the static ratios are considered more important. They indicate the velocity at which the business is operating. The sales-worth ratio is given a weight of only 5% because worth has already been weighted to an amount of 40% and because as has been previously pointed out this ratio may not always indicate a poor condition when it is low. This is true in a sense as worth does not necessarily vary with sales.

In some cases weights must be changed in order to meet certain conditions. This is illustrated very well by group number three. This group is composed of wholesale lumber dealers without yards or inventory and consequently companies in this group have no merchandise and

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(1) Ratio Method of Statement Analysis and Type figures - 1925 Bulletin published by the Robert Morris Association.

practically no fixed assets. But in comparison to worth fixed assets give a Worth-Fixed ratio of 629 so this was considered in the weighting. Weights here are also arbitrary but are made to fit the conditions. They are as follows: Current and Worth-Debt ratios - 35% each; Sales-Worth and Worth-Fixed - 5% each and the Sales Received ratio - 20%. It was on this basis our geometric index was prepared. Some may disagree as to weights used and may change them.

PREPARING THE INDEX: The preparation of the index was a mechanical process. The first step was to place in the column marked ratio the various type ratios of the particular group. The ratio was then multiplied by the weight and the results added to find the weighted arithmetic average. The next step was to find the logs of the various ratios and multiply them by the various weights. These values wer also added and the number in the log table corresponding to their sum was the weighted geometric average.

WHAT THE INDEX SHOWS: The result has been to reduce the eight ratios to one figure by two different averages. The weighted arithmetic average is larger than the weighted geometric average in every case. The trouble with this index is that as only one year was being considered no base could be used and consequently the figure is not of so very much importance. It does however illustrate the standard figure for the industry. In order to show how this method

may be applied when ratios can be obtained for a number of years, seven statements were studied for a period of three years. The base used in this case was the average of the ratios for the three year period. For example, the current ratios for the three years in the Kansas City district which was treated in this manner were found to be: 362,408 and 455 and their average which is 406 was used as a base. The procedure was to divide the ratio for 1923 which is 362 by 406 giving a relationship of 89. The log of the relationship was then found and multiplied by its assigned weight. This gave a value column whose total was a log and the number corresponding in the log table was the index. Tables are given below which show these calculations.

RESULTS OF THE INDEX WHEN A BASE IS USED: In this case we can easily see that our index means more. We see for example that the years 1923 and 1924 were practically the same as in 1923 the index was 97.03% and in 1925 it was 103.07%. Evidently the year 1925 was the best year for these several companies.

WEIGHTED ARITHMETIC AVERAGE METHOD: The method as described above has never been used by the Robert Morris Association. Its value is that theoretically a geometric average is the only average that is the true average for ratios. To show the trend of a business over a period of years the method used by the Robert Morris Association is very similar. Here the process is merely to find the

weighted arithmetic average using the same base as was used above. In this case it happens that both methods give practically identical results. The geometric average is only a little under the arithmetic average during each of the years. Both methods are good but as mentioned in the beginning of the Chapter the geometric average is not very generally understood and consequently the second method used will be best adapted to the needs of the credit man.

Tables are given below which show the calculations that were made to form the various Index Figures.

TABLE NO. 18.

Group #1, 1926 - Index. Geometric Average Used.

| | | WTl | VALUE | Log of R. | Log x Weight. |
|---|---|---|---|---|---|
| Current | 372 | 25 | 93.00 | 2.57054 | .64263 |
| Mdse. Received | 109 | 0 | | | |
| Worth-Fixed | 307 | 15 | 46.05 | 2.48714 | .37307 |
| Worth-Debt. | 389 | 25 | 97.25 | 2.58995 | .64749 |
| Sales-Received | 483 | 10 | 48.30 | 2.68395 | .26839 |
| Sales-Mdse. | 381 | 10 | 38.10 | 2.58092 | .25809 |
| Sales-Fixed | 555 | 10 | 55.50 | 2.74429 | .27443 |
| Sales-Worth | 176 | 5 | 8.80 | 2.24551 | .11227 |
| | | | 387.00 | | 2.57637 |

A. A. = 387.00
G. A. = 377.03

TABLE NO. 19.

Index of Group Number Two.

| | RATIO | WT. | VALUE | LOG OF R. | VALUE |
|---|---|---|---|---|---|
| Current | 248 | 25 | 62.00 | 2.39445 | .59861 |
| Mdse. Received | 178 | 0 | | | |
| Worth-Fixed | 185 | 15 | 27.75 | 2.26717 | .34007 |
| Worth-Debt | 162 | 25 | 40.50 | 2.20952 | .55190 |
| Sales-Received | 763 | 10 | 76.30 | 2.88252 | .28825 |
| Sales-Mdse. | 493 | 10 | 49.30 | 2.69285 | .26929 |
| Sales-Fixed | 786 | 10 | 78.60 | 2.89542 | .28954 |
| Sales-Worth | 269 | 5 | 13.45 | 2.42975 | .12148 |
| | | | 347.90 | | 2.45913 |

G. A. = 287.83

A. A. = 347.90

TABLE NO. 20.

Group Number Three - 1925 - 17 Names.

| | RATIO | WT. | VALUE | LOG | VALUE |
|---|---|---|---|---|---|
| Current | 220 | 35 | 77.00 | 2.34242 | .81985 |
| Worth-Fixed | 605 | 5 | 30.25 | 2.78176 | .13909 |
| Worth-Debt | 217 | 35 | 75.95 | 2.33646 | .81761 |
| Sales-Received | 605 | 20 | 121.00 | 2.78176 | .55635 |
| Sales-Worth | 800 | 5 | 40.00 | 2.90309 | .14515 |
| | | | 344.20 | | 2.47805 |

G. A. index = 344.20

A. A. index = 301

TABLE NO. 21

Group Number Four - 1925 - 50 names.

| | RATIO | WT. | VALUE | LOG OF R. | VALUE |
|---|---|---|---|---|---|
| Current | 242 | 25 | 60.50 | 2.38382 | .59595 |
| Mdse. Received | 89 | | | | |
| Worth-Fixed | 206 | 15 | 30.90 | 2.31387 | .34708 |
| Worth-Debt | 233 | 25 | 57.25 | 2.36736 | .59184 |
| Sales-Received | 461 | 10 | 46.10 | 2.66370 | .26637 |
| Sales-Mdse. | 491 | 10 | 49.10 | 2.66108 | .26611 |
| Sales-Fixed | 424 | 10 | 42.40 | 2.62737 | .26274 |
| Sales-Worth | 225 | 5 | 11.25 | 2.35218 | .11761 |
| | | Average | 297.50 | | 2.40770 |

Log = 2.40770

Index = 255.69

TABLE NO. 22.

Total 128 statements.

| | RATIO | WT. | VALUE | LOG OF R. | VALUE |
|---|---|---|---|---|---|
| Current | 308 | 25 | 77.00 | 2.48855 | .62221 |
| Mdse. Received | 89 | | | | |
| Worth-Fixed | 237 | 15 | 35.55 | 2.37475 | .35621 |
| Worth-Debt | 234 | 25 | 58.50 | 2.36992 | .59248 |
| Sales-Received | 517 | 10 | 51.70 | 2.71349 | .27135 |
| Sales-Mdse. | 505 | 10 | 50.50 | 2.70329 | .27033 |
| Sales-Fixed | 558 | 10 | 55.80 | 2.74663 | .27466 |
| Sales-Worth | 237 | 5 | 11.85 | 2.37475 | .11874 |
| | | | 340.90 | | 2.50598 |

A. A. Index = 340.90

G. A. Index = 320.61

TABLE NO. 23

Select ratios used to find a base. Kansas City District.

| | 1923 | 1924 | 1925 | Average. |
|---|---|---|---|---|
| Current | 362 | 408 | 455 | 406 |
| Mdse-Received | 186 | 166 | 155 | 169 |
| Worth-Fixed | 280 | 310 | 277 | 289 |
| Worth-Debt | 418 | 439 | 577 | 478 |
| Sales-Received | 625 | 482 | 557 | 555 |
| Sales-Mdse. | 303 | 274 | 386 | 321 |
| Sales-Fixed | 501 | 428 | 451 | 460 |
| Sales-Worth | 177 | 144 | 162 | 161 |

TABLE NO. 24

Index. Kansas City District.

| | 1923 | | | 1924 | | | 1925 | | |
|---|---|---|---|---|---|---|---|---|---|
| | WT. | REL. | VALUE | WT. | REL. | VALUE | WT. | REL. | VALUE |
| Current | 25 | 89 | 22.25 | 25 | 100 | 25.00 | 25 | 112 | 28.00 |
| Mdse. Received | 0 | | | 0 | | | 0 | | |
| Worth-Fixed | 15 | 110 | 16.50 | 15 | 98 | 14.70 | 15 | 92 | 13.80 |
| Worth-Debt | 25 | 87 | 21.75 | 25 | 107 | 26.75 | 25 | 95 | 23.75 |
| Sales-Received | 10 | 113 | 11.30 | 10 | 92 | 9.20 | 10 | 121 | 12.10 |
| Sales-Mdse. | 10 | 94 | 9.40 | 10 | 87 | 8.70 | 10 | 120 | 12.00 |
| Sales-Fixed | 10 | 109 | 10.90 | 10 | 85 | 8.50 | 10 | 98 | 9.80 |
| Sales-Worth | 5 | 110 | 5.50 | 5 | 89 | 4.45 | 5 | 101 | 5.05 |
| Index | | | 97.60 | | | 97.30 | | | 104.50 |

TABLE NO. 25.

Kansas City District. Geometry Average Index. - 1923

| | REL. | LOG | WT. x | LOG |
|---|---|---|---|---|
| Current | 89 | 1.94939 | 25 | .48735 |
| Mdse. Received | | | | |
| Worth-Fixed | 110 | 2.04139 | 15 | .30621 |
| Worth-Debt | 87 | 1.93952 | 25 | .48488 |
| Sales-Received | 113 | 2.05308 | 10 | .20531 |
| Sales-Mdse. | 94 | 1.97313 | 10 | .19731 |
| Sales-Fixed | 109 | 2.03743 | 10 | .20374 |
| Sales-Worth | 110 | 2.04139 | 5 | .10207 |
| | | | | 1.98687 |

Log = 1.98687

Index = 97.03

| 1924 | REL. | LOG | WT. | VALUE |
|---|---|---|---|---|
| Current | 100 | 2.00000 | 25 | .50000 |
| Mdse. Received | | | | |
| Worth-Fixed | 98 | 1.99123 | 15 | .29868 |
| Worth-Debt | 107 | 2.02938 | 25 | .50734 |
| Sales-Received | 92 | 1.96379 | 10 | .19638 |
| Sales-Mdse. | 87 | 1.93952 | 10 | .19395 |
| Sales-Fixed | 85 | 1.92942 | 10 | .19294 |
| Sales-Worth | 89 | 1.94939 | 5 | .09747 |
| | | | | 1.98576 |

Log = 1.98672

Index = 97.00

Kansas District - 1925

| | REL. | LOG | WT. | VALUE |
|---|---|---|---|---|
| Current | 112 | 2.04922 | 25 | .51230 |
| Mdse. Received | | | | |
| Worth-Fixed | 92 | 1.96379 | 15 | .29457 |
| Worth-Debt | 95 | 1.97772 | 25 | .49443 |
| Sales-Received | 121 | 2.08279 | 10 | .20828 |
| Sales-Mdse. | 120 | 2.07918 | 10 | .20792 |
| Sales-Fixed | 98 | 1.99123 | 10 | .19912 |
| Sales-Worth | 101 | 2.01432 | 5 | .10071 |
| | | | | 2.01733 |

Log = 2.01733

Index = 103.07

## CHAPTER V.

## [illegible]

# A DEMONSTRATION OF THE VALUE OF TYPE RATIOS.

Introduction: It has been our purpose up to this point to discuss methods of statement analysis, prepare type figures and 100% statements and to show how to construct an index. It will be the aim of this chapter to show what use may be made of what has been found by comparing several individual companies with our group figures. The Kansas City district will also be compared so as to show its relationship to the country at large.

Selection of Companies: Companies have been selected from the various groups. They were chosen merely by chance and any other company would have been suitable. However, as the Kansas City district is compared to the group, it was thought best to select individual companies for comparison from other sections of the country.

Method of Comparison: In Chapter Three we developed type ratios and 100% statements and in Chapter Four we have been shown several methods of constructing an index figure. We constructed our index by means of a weighted arithmetic and a weighted geometric average and so we will try and see how our individual companies selected at random will compare with these index figures.

But before we proceed with this comparison there is another method which must be explained. This index is the one constructed by the Robert Morris Associates and is probably the best method of comparison. By use of this index each individual ratio of the individual company is compared to the corresponding selected ratio. The selected ratios are the base used. For example, to find the relationship

that an individual current ratio bears to the base, divide the individual by the base. In company ten of group No. 1 the formula would be as follows $\frac{\text{Individual} = 304}{\text{Base} = 372} = 82$ - This percentage relationship is then placed in the column which in our table is marked "rel." It will be noticed in comparing ratios of individual company No. 10 to selected ratios of group one, that, in some instances the individual ratios are much larger than the base ratio. For example, the individual sales-merchandise ratio is 862 and the base sales-merchandise ratio is only 381 so that our formula if applied would be $\frac{862}{381}$ which would give an answer of 226. It can easily be seen that there is a possibility of the individual ratio being even much larger than the base ratio than is the case here. As a matter of fact we could get a relationship extremely high for the 'relationship of one number to another can fluctuate downward from 100 to 0, but the sky is the limit in the fluctuation upward." In order to correct this situation and prevent the possibility of anyone ratio unduly emphasizing the index another formula has been developed by the Robert Morris Associates. This formula is 100 + 100 $- \frac{\text{Base ratio}}{\text{Individual ratio}} =$ Relationship. So with this formula the upward limit has been set for cases where the individual ratio is greater than the base ratio for no relationship can be as great as 200. In the example used above our formula would be: 100 + 100 $- \frac{381}{862} = 156$. The rule for this formula is that it is to be used whenever the individual ratio is greater than the base ratio.

It will be noticed that the weights used for this index are the same as those that have been used in the preparation of our other index. Some may disagree as to the weights that should be used in these indices and if such be the case a change can easily be made to make the index fit the situation such as was done in the preceding Chapter for group number 3, (1925).

Let us turn and look at the results which we have obtained by use of the various methods of preparing our index. Let us first look at our index figure derived from the geometric average. Two different companies were selected from group number one and the geometric average worked for each with group one ratio as a base, the same weights being used as were used to prepare the group index.

TABLE NO. 26.

Index of Company Number ten. Group one - select ratios as a base formula used.

| | Co. | Group One | Wt. | "Rel." | Value |
|---|---|---|---|---|---|
| Current | 304 | 372 | 25 | 82 | 20.50 |
| Misc.-Inc. | 69 | 139 | 0 | | |
| Worth-Fixed | 313 | 307 | 15 | 102 | 15.30 |
| Worth-Debt | 300 | 389 | 25 | 77 | 19.25 |
| Sales-Inc. | 490 | 483 | 10 | 102 | 10.20 |
| Sales-Misc. | 862 | 381 | 10 | 156 | 15.60 |
| Sales-Fixed | 910 | 565 | 10 | 139 | 13.90 |
| Sales-Worth | 290 | 176 | 5 | 139 | 6.95 |
| | | | | | 101.70 |

Company Number ten is located in the state of Illinois and is a retail dealer of lumber and coal. Some objection might be raised for using this company because it deals in coal but as the company is classed by the National Lumber Manufacturers Credit Corporation as a retail

lumber dealer it was thought best that it be used, as such a practice is quite common among lumber dealers of this size. Here we are able to use the geometric index method to better advantage as type ratios can be used as base figures. Such an index was prepared and is given in table a on page . We get a figure of 105.89% which indicates that the company is just a little better than the normal company.

This is true in spite of the fact that the current and worth-debt ratios are much larger in the group figures. The condition of this company has been improved because of its high sales ratios.

But let us now look at the following table which shows the relationship between the type figures and the individual company when the type figures are used as a base.

TABLE NO. 27.

Index of Company number ten - Select ratios of group one as a base - Geometric average.

| | Co. | Group 1 | Wt. | "Rel." | Log. of Rel. | Value |
|---|---|---|---|---|---|---|
| Current | 304 | 372 | 25 | 82 | 1.91381 | .47845 |
| Mdse.-Rec. | 59 | 109 | 0 | | | |
| Worth-Fixed | 313 | 307 | 15 | 102 | 2.02860 | .30429 |
| Worth-Debt | 300 | 389 | 25 | 77 | 1.88649 | .47162 |
| Sales-Rec. | 490 | 483 | 10 | 102 | 2.02860 | .20286 |
| Sales-Mdse. | 862 | 381 | 10 | 226 | 2.35411 | .23541 |
| Sales-Fixed | 910 | 555 | 10 | 164 | 2.21484 | .22148 |
| Sales-Worth | 290 | 176 | 5 | 164 | 2.21484 | .11074 |
| | | | | | | 2.02485 |

Log. = 2.02485
G. A.= 105.89%

It will be noticed that the index is 101.70% which indicates only a very small increase above normal. The reason this index is only 1.70% above normal is that the formula of $100 + 100 - \frac{\text{base}}{\text{individual}} =$ "rel." has resulted in taking importance from the sales ratios which in this case happen to be much larger than the base ratios. The geometric average on the other hand has risen more because it has not been made inelastic by an arbitrary formula. Both indices show improvement and are valuable.

But in order to make our comparison more vivid a 100% statement was worked out for company number ten and it is set along side a 100% statement of the group. Dollar statements are also shown.

Table No. 22, given on next page.

TABLE NO. [illegible].

A comparison of group one and company number ten, group one.

| | Group one | | No. 10, group one. | |
|---|---|---|---|---|
| Cash | 382,410 | 4.93% | 5,168 | 6.49% |
| Receivables | 2,431,501 | 31.37 | 25,294 | [illegible] |
| Merchandise | 2,827,310 | 36.49 | 30,100 | [illegible] |
| Gov. Bonds | 700 | | | |
| Miscellaneous | 107 | | | |
| Total Current | 5,642,028 | 72.79 | 60,562 | 76.09 |
| Total Fixed | 2,108,674 | 27.21 | 19,040 | 23.91 |
| TOTAL | 7,750,702 | 100.00% | 79,603 | 100.00% |
| | | | | |
| Payables | 1,271,219 | 16.40% | 19,666 | 24.70 |
| Taxes | 11,848 | .15 | | |
| Miscellaneous | 95,729 | 1.23 | 223 | .28 |
| Total Current | 1,378,794 | 17.78 | 19,889 | 24.98 |
| Funded | 91,295 | 1.18 | | |
| Total Debt | 1,470,089 | 18.96 | 19,889 | 24.98 |
| | | | | |
| Reserves | 154,994 | 2.00 | | |
| Net Worth | 6,125,619 | 79.04 | 59,714 | 75.02 |
| TOTAL | 7,750,702 | 100.00% | | 100.00% |
| SALES | 11,800,435 | 151.77 | 173,304 | 217.71 |

By glancing at the 100% statements it can be seen that in many respects the individual company does not check up to the group figures. For example payables in company ten are 24.70% of total liabilities while in the group they are only 1640%. Current liabilities consequently make up more of the total liabilities in company ten. However, current assets are not proportionately larger than current assets of the group. Then again current assets are not in the right proportion as the Merchandise-Receivables ratio is only 59 while the group Merchandise-Receivables ratio is 109. We have pointed out that in a period of rising prosperity it is best to have a large inventory to take advantage of a speculative rise in prices and 1925 is such a period so the ratio here indicates a poor condition. The absence of reserves and funded debt makes very little difference as a great many companies within the group had neither. Conclusions: Although both indices would lead us to consider that company number ten is better than the average company an examination of the two 100% statements indicates that the individual company does not check up to average in several different ways and consequently our conclusion is somewhat modified. Company number ten has been controlled by sales which are 217.71% of assets while in the group sales only make 15177% of total assets. Statements over a period of several years might alter the relation and prove that sales for company number ten were unusually high for the year 1925.

The second company compared to group one figures is company number five. This company deals in retail lumber and is located in Tennessee. No particular reason can be given for the selection of this company and its selection was purely a matter of chance.

The same procedure as used in comparing company number ten was followed out here as both the geometric average index and select ratio base index have been prepared. The same weights were used as have been used in all of the indices that have been prepared.

It will be noticed that the geometric average index shows that compared with group number one the company's is below normal as its index figure is only 78.63%. Group one selected ratios were used as a base in this comparison.

Although no conscious attempt was made to select a company whose index would be lower than the group index this has been the case and evidently the company is not up to standard. But let us also look at the index which has been prepared using the select ratios as a base. It will be noticed that even though there is only ratio larger than a base ratio and which by our formula of 100 à 100 $- \frac{\text{base}}{\text{individual}} =$ "Rel." the index is still very low at 85.30. With both indices much lower than the group index figures our conclusion must be that company number five is much lower than the average. But before coming to this conclusion let us look at the 1931 statements which are shown in the following table.

TABLE NO. 29.

Geometric average index of Company No. 5, group 1, ratio used as a base.

|  | CO. | GROUP | REL. | LOG. | WT. | VALUE |
|---|---|---|---|---|---|---|
| Current | 328 | 372 | 88 | 1.94448 | 25% | .48612 |
| Misc.-Rec. | 35 | 109 |  |  |  |  |
| Worth-Fixed | 534 | 307 | 173 | 2.23805 | 15% | .33571 |
| Worth-Debt | 273 | 389 | 70 | 1.84510 | 25% | .46127 |
| Sales-Rec. | 111 | 483 | 23 | 1.36173 | 10% | .13617 |
| Sales-Mdse. | 316 | 381 | 84 | 1.92428 | 10% | .19243 |
| Sales-Fixed | 520 | 555 | 93 | 1.96848 | 10% | .19685 |
| Sales-Worth | 97 | 176 | 55 | 1.74036 | 5% | .08702 |
|  |  |  | 78.63% |  |  | 1.89556 |

TABLE NO. 30.

Company No. 5, group No. 1, 1936

|  | CO. | GROUP | WT. | REL. | VALUE |
|---|---|---|---|---|---|
| Current | 328 | 372 | 25 | 88 | 22.00 |
| Misc.-Rec. | 35 | 109 | 0 |  |  |
| Worth-Fixed | 534 | 307 | 15 | 143 | 21.45 |
| Worth-Debt | 273 | 389 | 25 | 70 | 17.50 |
| Sales-Rec. | 111 | 483 | 10 | 23 | 2.30 |
| Sales-Mdse. | 316 | 381 | 10 | 84 | 8.40 |
| Sales-Fixed | 520 | 555 | 10 | 93 | 9.30 |
| Sales-Worth | 97 | 176 | 05 | 55 | 2.75 |
|  |  |  |  |  | 83.70 |

Upon a close examination of this table it can easily be seen that our index figures have told the true story. Although current assets are 86.51% of total assets in company number five and current assets in group number one amount to only 74.70%, company five current ratio is much lower and its current position worse because payables make current liabilities larger in group five. But the 100% statement shows more clearly why the index is below normal when the sales percentage is considered for sales are 151.77% of assets in group number one and in company five are only 70.51%. It is strange that both of the companies should be affected by sales for the poor condition may have been due to other reasons. It is a coincidence that sales raised the index in company ten and have lowered it here. In connection with the poor sales condition the weakness of the company is further indicated when it is noticed that the Merchandise-Receivables ratio which is not used as an index ratio is only thirty-five while the selected figure is 109.

TABLE NO. 31.

Company Number five in group one to group one.

| | GROUP | | Co. Number five. | |
|---|---|---|---|---|
| | $ | % | $ | % |
| Cash | 382,410 | 4.93 | 3,310 | 1.32 |
| Rec. | 2,431,501 | 31.37 | 158,755 | 62.97 |
| Mdse. | 2,827,310 | 36.49 | 55,995 | 22.22 |
| Gov. Bonds | 750 | | | |
| Miscellaneous | 107 | | | |
| Total Current | 5,642,078 | 72.79 | 218,060 | 86.51 |
| Total Fixed | 2,108,624 | 27.21 | 34,022 | 13.49 |
| TOTAL | 7,750,702 | 100.00 | 252,082 | 100.00 |
| Payables | 1,271,219 | 16.40 | 57,625 | 22.86 |
| Taxes | 11,846 | .15 | | |
| Miscellaneous | 95,729 | 1.23 | 8,721 | 3.46 |
| Total Current | 1,378,794 | 17.78 | 66,346 | 26.32 |
| Funded | 91,295 | 1.18 | | |
| Total Debt | 1,470,089 | 18.96 | 66,346 | 26.32 |
| Reserves | 154,994 | 2.00 | 4,027 | 1.60 |
| Net Worth | 6,125,619 | 79.04 | 181,709 | 72.08 |
| TOTAL | 7,750,702 | 100.00 | 252,082 | 100.00 |
| SALES | 11,800,435 | 151.77 | 177,000 | 70.51% |

Conclusion: In the light of all that has been shown by this company's statement the only conclusion that can be drawn is that the company is below normal and care should be exercised in granting credit. In this connection it should be remembered that such an analysis as has been made here contains nothing of the personal element which must always be considered in granting credit. Although our conclusions would lead us to say that company number ten is in a very much better condition, yet if it were also possible to consider the history of each company, and know something of the men in control our conclusions might be materially changed. It can be said however, that comparisons as made above are certainly very important supplements to any other knowledge one may possess as to the character and capacity of the individual companies.

The Kansas City District: It was pointed out in Chapter three how an index should be prepared when statements can be obtained over a period of years. The seven statements from the Kansas City District were used as they are the only statements which are for more than one year. But in addition to the index which was prepared to show the trend of the seven companies over the three year period two indices have been prepared for the seven statements of the year 1925. The first index was prepared by use of the geometric average and the second by the method used by the Robert Morris Associates. Let us now turn and look at the results that have been obtained. We notice that the geometric average index is at 104.59% of the group and that

TABLE NO. 32.

Kansas City District - 1920 - with group av. ratios as a base.

| | CO. | GROUP | WT. | REL. | VALUE |
|---|---|---|---|---|---|
| Current | 453 | 372 | 25 | 119 | 29.75 |
| Mdse.-Rec. | 155 | 109 | 5 | | |
| Worth-Fixed | 277 | 307 | 15 | 90 | 13.50 |
| Worth-Debt | 577 | 389 | 25 | 133 | 33.25 |
| Sales-Rec. | 557 | 483 | 10 | 115 | 11.40 |
| Sales-Mdse. | 366 | 381 | 10 | 96 | 9.60 |
| Sales-Fixed | 451 | 555 | 10 | 81 | 8.10 |
| Sales-Worth | 162 | 176 | 5 | 92 | 4.60 |
| | | | | | 110.20 |

TABLE NO. 32A.

Index of Kansas City District - Year 1918 - Geometric average method.

| | REL. | LOG. | WT. | VALUE |
|---|---|---|---|---|
| Current | 122 | 2.08368 | 25 | .52092 |
| Worth-Fixed | 90 | 1.95424 | 15 | .29313 |
| Worth-Debt | 148 | 2.17026 | 25 | .54256 |
| Sales-Rec. | 115 | 2.06070 | 10 | .20607 |
| Sales-Mdse. | 96 | 1.98227 | 10 | .19823 |
| Sales-Fixed | 81 | 1.90363 | 10 | .19036 |
| Sales-Worth | 92 | 1.96379 | 5 | .09819 |
| | | | | 2.04951 |

Log = 2.04951

Index = 104.59

TABLE NO. [illegible].

A comparison of [illegible] statements of the Kansas City District for 1925 to group the statements for 1925.

| | 100% | 100% |
|---|---|---|
| Cash | 4.93 | 2.54 |
| Receivables | 31.37 | 24.93 |
| Merchandise | 36.49 | 41.39 |
| Total Current | 72.79 | 68.86 |
| Total Fixed | 27.21 | 31.14 |
| Payables | 16.40 | 13.88 |
| Taxes | .15 | .67 |
| Miscellaneous | 1.23 | .04 |
| Total Current | 17.78 | 14.59 |
| Resources | 3.18 | |
| Worth | 79.04 | 85.41 |
| TOTAL | 100.00% | 100.00% |
| SALES | 151.77% | 144.24% |

the other is at 110.20% of group one. The same thing has resulted here that has resulted in every case where the geometric average has been used as it is lower in every case.

The Kansas City District group figures are better than figures for the entire country because they have a much higher current and worth-debt and sales receivables ratios. Other ratios are all lower but as they are given smaller weights do not influence the index. But let us now turn and study the 1927 statements for the two groups have been set side by side in table number thirty-three. An examination of this table throws further light upon the subject. First of all is noted that merchandise is much more in evidence in the Kansas City district group and it is interesting, in this connection, to refer back to table number thirteen in chapter Three and note that this is about the same proportion of merchandise that the group has had in all three years. Having this extra information available for the Kansas City district the conclusion must be that a company in that district will have a larger amount of inventory. However, if group one figures were carried over a period of three years the proportion of merchandise might be more. But what this shows more than anything else is that the collection policy is better in the Kansas City district. This conclusion is borne out by the two sales-receivables ratios. The group one sales-receivables ratio is 300 and the Kansas City district ratio 377. It will also be noted that the sales percentage of total assets is lower in the Kansas City district and that no time during the three years has this percentage been as high as the 151.77% for

group was in 1925. The standard is evidently lower.

Conclusions: Both indices indicate that the Kansas City district is in a better condition and a study of the 100% statements has shown that this is true. But in the light of 100% statements for 1923 and 1924 it must be concluded that the amount of sales in proportion to total assets is not as high as in the whole group.

# CHAPTER VI.

## THE BUSINESS CYCLE.

## THE BUSINESS CYCLE.

In Chapter one we mentioned that recently business men have added to what was known as the three "C's" of credit; a fourth "C" called the Cycle. It is a recognized fact that in every business there occurs good years and bad years. A period of prosperity will culminate into a crisis and in turn the crisis will breed depression. But it will not be long until this same period of depression will also culminate into a period of prosperity and the process has been repeated. As a general rule it takes but a very short time to destroy what has been built up in the period of rising prosperity but it usually takes very much longer to build up what has been destroyed. As was explained in Chapter two the business Cycle must be studied, as in a period of rising prices, a company should have a larger inventory, as it is constantly increasing in value. But in a period of falling price levels it is best to have a larger proportion of receivables.

Theory as to Movement of the Lumber Cycle: In the lumber industry, as in other industries, prices move up and down rapidly. A rise in prices is usually caused by an increase in constructional activity causing a demand for lumber. In a period of depression the production of lumber has been curtailed and surplus stocks have been used. The result then of constructional activity which has been started by the period of low prices has been to increase prices and production. Production is increased by running night shifts, working overtime, building of new mills and of bringing of idle mills into operation. The demand is met sooner or later and

the result is that the excess lumber is dumped upon the market and prices fall, a period of depression follows and some mills are forced to operate at a loss.(1)

Credit Analysis and the Business Cycle: In order to show the relationship between the analysis of companies by the ratio method of analysis and the business cycle it is first necessary to determine the lumber cycle. In order to do this several different indicators of the cycle were selected. Those selected are as follows:

1. Building Activity: When lumber prices are low our theory is that construction will increase. In order to show building activity figures were obtained as to the amount of contracts . This information has been obtained for the years 1919-25 inclusive. In order to represent graphically so that it might be compared with other information the year 1919 has been used as a base year.

The source of information in regard to building activity was the reports of the F. W. Dodge Corporation.

> "The F. W. Dodge Corporation has been in the business of gathering construction news since 1892. The present system of tabulating statistical records has been in process of development since 1919. While every precaution that experience suggests is taken to prevent errors, absolute accuracy in the statistical tables cannot be guaranteed."(2)

The F. W. Dodge Corporation divides the Country into the following ten districts:

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(1) The American Lumber Industry by C. W. Brown contains an excellent discussion of the lumber cycle theory. Pages 131-35.
(2) Statement made by the F. W. Dodge Corporation in connection with each of its reports.

1. Thirty-seven Eastern States (includes the Dakotas, Nebraska, Kansas, Oklahoma, Arkansas, Texas, and all states east of these. Ninety-one percent of United States Construction total.
2. Twenty-seven Northeastern States (3/4 of United States Total). (Same as above omitting Southeastern States and Texas).
3. New England States.
4. New York State and Northern New Jersey.
5. Middle Atlantic States.
6. Pittsburgh District.
7. The Central West.
8. The Northwest.
9. Southeastern States.
10. Texas.

The above ten classes are then subdivided by states and principal cities and information is given for them the same as for the group. The significant thing to note is that the reports cover small towns and rural districts.

Reports are made as to the amount of contemplated projects and contracts awarded. Information is given as to the number of projects, new floor space in square feet and the valuation. The projects are classified in the following manner:

1. Commercial buildings.
2. Educational buildings.
3. Hospitals and Institutions.
4. Industrial buildings.
5. Military and Naval buildings.
6. Public buildings.

7. Public works and utilities.

8. Religous and Memorial buildings.

9. Residential buildings.

10. Social and recreational buildings.

The year 1919 has been used as a base year. No calculation has been made to remove the trend, or to remove seasonal and cyclical fluctuations. The reason raw figures were used was because it would be impossible to make the same calculations for the lumber companys which are to be compared with the various indicators of the business cycle.

Three of the above ten classes have been selected for the purpose of comparison. These three classes are:

1. Business (Commercial) Buildings: This includes banks; garages and service stations (public); garages (Private), with stores and factories; greenhouses; lofts; office buildings, restaurants; stables (livery and sales); stores; warehouses and storage buildings.

2. Industrial buildings: "This includes coal pockets and tipples; factories; heating and power plants."

3. Residential buildings: Includes all apartments, flats and tenements; all dwellings, barns and farm buildings, dormitories; garages (private); hotels; stables(private).

The F. W. Dodge Corporation reports were used for the twenty-seven Northeastern States which amounts to seventy-five percent of the United States total. This particular territory was chosen because it is practically the same over the seven year period.

> "The Dodge Territory now includes thirty-six states and the District of Columbia and represents seven-eighths of the total population but from the middle of 1921 to January 1, 1923, the figures included about seventy-five percent of the total construction volume; from May 1, 1920 to May 1, 1921, seventy-four percent; from January 1, 1915 to May 1, 1920, seventy-two percent, before January 1, 1915, sixty-nine percent."(1)

II. Lumber Production: In order to show the lumber cycle the second indicator chosen was the amount of lumber produced over the seven year period. These figures were obtained from the Survey of Current Business for February, 1926, table number, sixty-two and from the August, 1924, issue, table number . Figures represent the total cut of ten species of lumber: Yellow pine, Douglas Fir, Hemlock, Western pine, Redwood, Maple, Birch, White fir and Sugar pine, representing over seventy percent of the total cut of lumber in the United States.

The year 1919 has been used as a base year. This method was used so lumber production and constructional activity could be shown on the same chart.

III. Lumber Prices: The third factor to be used to determine the lumber cycle is lumber prices. It consists of "/Composite lumber prices compiled weekly and data published in the Lumber Manufacturer and Dealer, representing combined weighted averages for the respective series of lumber based on quotations on various grades for each species. The species are weighted according to annual production of the previous

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(1) Explanation of tables given by F. W. Dodge Corporation in the Graphic Review for January 1924.

year, the weights changed about May of each year, when the new production figures are available. The softwood index is based upon seven species: Yellow pine, Douglas Fir, North Carolina pine, White pine, Hemlock, Spruce and Cypress. The hardwood index is based upon thirteen species: Maple, Birch, Beech, Basswood, Elm, Oak, Gum, Ash, Cottonwood, Chestnut, Poplar, Hickory and Walnut. Figures formerly published (before May, 1924) covered only the first week of the month."(1) The prices were obtained from the Statistical Year Book of the United States for the year 1924, page 668. Lumber prices are also given for both hard and soft woods combined. This is the price given out by the Bureau of the Census and is also found in the Statistical Year Book for 1924. Both of these price indices have been plotted on Chart No. 5.

A third price index has been used. It is the index of building materials (wholesale prices) and has been taken from the Survey of Current Business for February, 1926. The base year for this index which is compiled by the United States Department of Labor is 1913. To place the index on a comparable base the index figure for 1919 which was two hundred and one was taken as a base. For example the 1921 index figure was two hundred and sixty-four which is one hundred and thirty-one percent of the 1919 index figure. This index has been plotted on the various Charts.

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(1) Explanation given in Statistical Year Book with index.

A small degree of error will be present by such a method of calculation which would not be present if the index was prepared by use of the geometric average. But the error is so small that the index figures will represent almost accurately the price base of building materials over the six year period.

IV. Select Ratio Index: In Chapter three the method of preparing select ratios was explained and such ratios were developed for four different groups of the lumber industry for the year 1925. In Chapter Four it was shown by using seven statements of the Kansas City District how an index could be prepared when statements can be obtained over a period of several years. It was also explained that it was impossible to secure statements for other years than 1925 so it was necessary to look further for select ratios to form an index for the years 1919 to 1924 inclusive. The Robert Morris Association has made industry studies of the lumber industry over a period of several years and has classed their companies as lumber yards and lumber mills and in order to secure select ratios to form an index the group consisting of lumber yards was selected. The number of statements in the group each year is given below:

| | | | |
|---|---|---|---|
| 1919 - 20 | 1921 - 28 | 1923 - 57 | 1925 - 50 |
| 1920 - 26 | 1922 - 27 | 1924 - 113 | |

When the index is compared with lumber production, construction, and prices the year 1925 will have to be modified to some extent as it consists of group number one of Chapter two

which contained only retail lumber dealers; while the Robert Morris select ratios for the years 1919-1934 are composed of lumber yards - both retail and wholesale.

Selection of a Suitable Base: Since we have already used the year 1919 as a base year for lumber production and for construction figures it was thought best to change from the method used in Chapter Four to prepare the Kansas City District index, where the base was the average ratio over the given period of years, and use 1919 for the base. This will enable us to place the index upon a more comparable basis in the preparation of charts which are shown at the end of this chapter. The year 1919 happens to be a very low year and consequently the formula of $100 \pm 100 - \frac{\text{base}}{\text{individual}} =$ "Rel." will be valuable for this index.

Let us now turn and make a study of the Charts that have been prepared and see what conclusions can be obtained from each. It will be noticed that Chart VI compares total building activity in the twenty-seven Northeastern States with the index of select ratios, lumber production and building material prices.

One of the first things one notices about the Chart is that the index prepared for the lumber companies does not fluctuate as much as any of the other indices. This is caused by the use of the formula. The formula is used only when the individual ratio is larger than the base ratio and it makes it impossible for the relationship to be greater than two hundred but can only approximate it.

The Chart points out very clearly the conditions

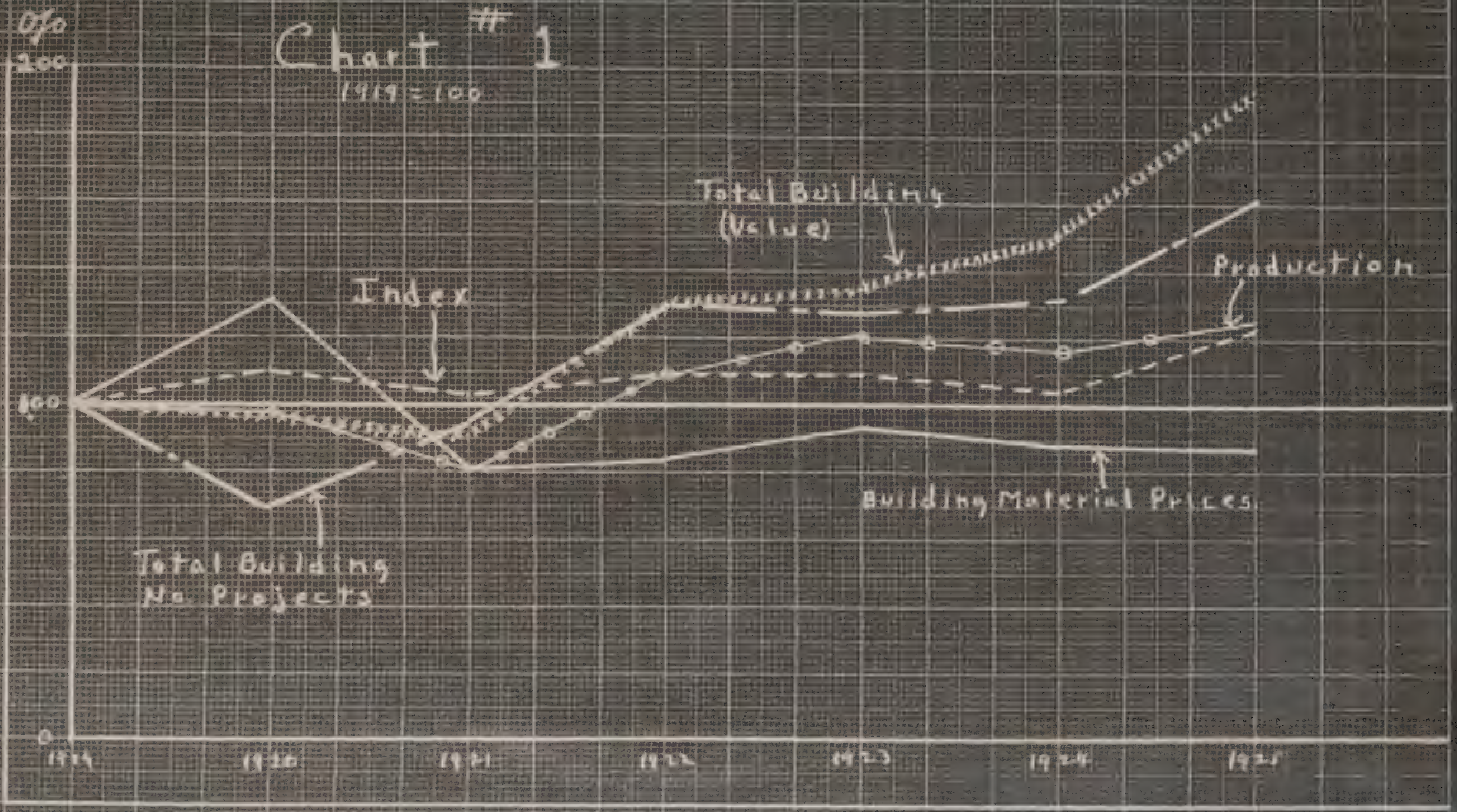


Chart # 1

1919 = 100

Donald D Magers

which have existed during the period. Prices of building material were still high in 1920. This situation was a result of after-war conditions. The chart is on a yearly basis so it is not possible to tell just exactly the period of the year when changes have occurred. Mr. Thomas S. Holden, statistician of the F. W. Dodge Corporation in an article published in December, 1923, made the following remarks in regard to construction activity since the Armistice.

> 'The year 1919 opened with a low rate of construction activity. After a few months it was evident that expected drops in cost levels were not going to take place. By midsummer a boom had developed. Spurred on by the boom in industrial and commercial fields, construction continued at an increasing high rate 'til the early months of 1920. Then came the collapse. The year 1920 was a year of decline; 1921 a year of gradual recovery to normal; 1922 a year of great construction volume, the revival extending into the early months of 1923, when a second reaction occurred.'

A glance at the chart will show the above to be true for building materials price index rose in the year 1920 and there was a decline in construction. The price index fell in 1921 while the number of projects has increased. It will be noticed that lumber production has also fallen as the price index falls and with a fall in the price index the index of select ratios of lumber yards has gone to its low mark for the six year period. Prices remained at about the same level in the year 1922 and the result was that 1922 was a year of great construction volume, lumber production increased and the select ratio index also rose. In 1923

construction remained at about the same throughout the year according to F. W. Dodge reports with the result that the construction average for the year was about the same as for 1922. Lumber production increased with the increase of prices while the select ratio index is at exactly the same level as in 1922. In 1924 the price level, lumber production and the select ratio index have all slightly fallen. While there has been a very slight rise in the number of building project contracts and a rise of fifteen percent in the building value index. It is difficult to understand just why this situation has existed but the following is given in partial explanation. In the first place by reference to table No. 39 it will be seen that in practically every case the index of wages per hour for men in the building trade has risen. Consequently, there will be a rise in the value of buildings as higher wages will increase the costs of construction and so in reality there has not been such a great rise in total construction. In turn, it can be seen that there would be a decline in the demand for lumber and building material and likewise a fall in the select ratio index. The decrease in the demand for lumber and building materials has likewise resulted in the decline which has been noted in the price level.

The year 1925 is a boom year in construction and all of the construction curves move in the upward direction. Prices are still falling; (it is interesting to note at this point that the two indices of prices that are given in Chart No. 5 agree with the index of building materials compiled

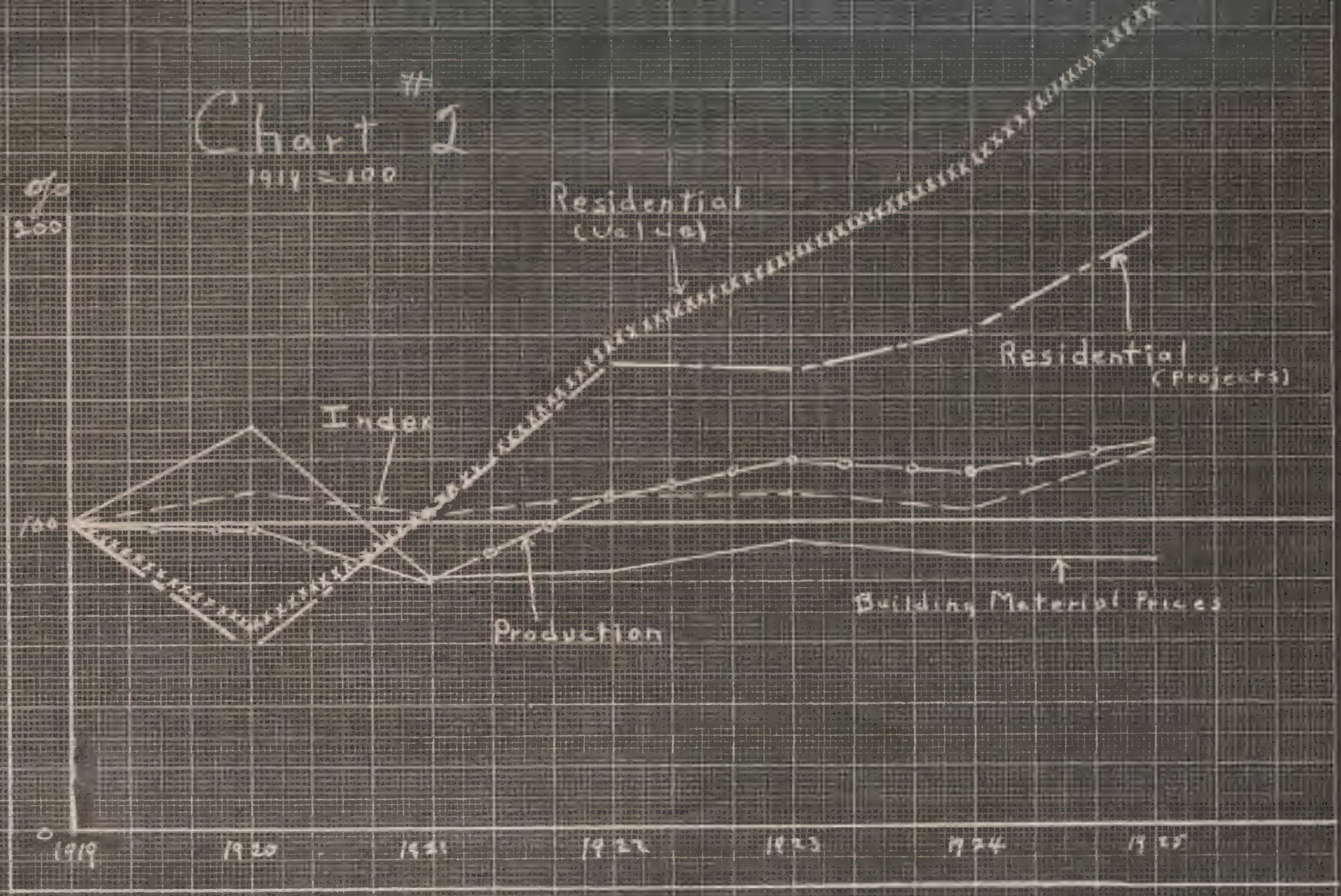
by the United States Department of Labor) but due to the tremendous boom in construction activity there has been an increase in lumber production and a rise in the select ratio index. The price index of building materials we have noted agrees with the Lumber Manufacturer and Dealer's index of hardwood and softwood prices, but it is probably more valuable an index because as a general rule companies listed as lumber yards will carry all sorts of building materials. In studying the select ratio position for 1925 it must be remembered that the index has been based for this year upon the select ratios of companies who do only a retail business. Undoubtedly, there has been a rise in the year 1925 but it is not as great a rise as is shown on the Chart. Construction activity has reached such a boom that even though the price level has slightly receded sales have increased and lumber dealers are in a much better position than they have been in the entire seven year period.

Index figures used to plot this chart are given in tables at the end of the Chapter.

We have noted that the F. W. Dodge Corporation classified construction into various groups. In order to show further the correlation between lumber prices, building material prices, lumber production, construction activity and the index of select ratios three other charts have been prepared. The first of these three is Chart No. 2. The only difference between it and Chart No. 1 is that in place of the curve of total construction activity has been substituted the curve of residential building. Mr. Holden in the article re-

## Chart #1

1919 = 100



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ferred to above pointed out that, "residential buildings comprise the largest sub-division of construction, amounting normally to about one-third of total construction." Consequently the importance of breaking up total construction into the various classes will be even more evident as far as residential buildings are concerned.

An examination of the Chart shows that it moves up more rapidly than the curve for total construction. The main difference between it and Chart No. 1 is that there has been more of an increase in residential building since 1919 than in any other class of building. The reason for this situation is evident for at the end of the War there existed a housing shortage. But because of the high price level for building materials housing construction did not start upon its great boom until the year 1921 when the price level fell.

In 1921 the construction index rose but due to the fall of building material prices, lumber production and the select ratio index fell. This has been pointed out in regard to Chart No. 1 as due to the decrease in profits caused by a low price level. When Charts No. 3 and No. 4 are studied other conditions will be noted. The cause of the ~~use~~ rise of the residential curve is the result of the building deficit in residential building caused by the War. Construction during the War period was mainly of an industrial nature.

The year 1922 shows a more rapid rise in residential building with the price level practically the same as the year 1921. With the rise in residential building there has been a demand for more lumber and so the lumber produc-

tion index has increased. There has been an increase in the amount of sales over the year 1921 and the select ratio index has risen.

The year 1923 in Chart No. 2 differs from Chart No. 1 only in the more rapid rise of the construction line. The curve showing projects has fallen but this is explained by the building materials price index curve which has risen causing construction to be more valuable. The index for the companies consequently has remained at its high point. The years 1924 and 1925 explained in Chart No. 1 are the same in this Chart.

In connection with the analysis of Chart No. 2 it is interesting to note that an article published by Doctor Willford I. King, in the July 1, 1925, issue of the, 'American Contractor,' pointed out that the curve of residential building volume anticipates all other business barometers except a curve of average prices in the bond market. Mr. Holden of the F. W. Dodge Corporation verified this conclusion and made the following remarks in explanation:

> "Money seeks long-term investment when the demand for it slackens in the field of commercial banking. At such a time idle money flows first into the bond market, then into real estate investments and after a period of time, into commercial fields." (1)

Since residential building makes up a very large percentage of total construction we would expect it to move in the same general direction, so let us now turn and look at Chart No. 3 which shows the relation between prices, production, the select ration index and industrial construction.

---

(1) Northwestern Commerce - December 1925.

The chart differs from No. 1 and No. 2 because 1919 was a big year for industrial construction. During the war construction was centered upon industrial enterprises, profits were large and there was a rapid increase in this type of construction. All was good as long as prices were held up but with the fall of prices in 1921, coupled with the over expansion of industry due to the anticipation of further profits which failed to materialize industrial construction fell off and had the effect of making the curve for total construction rise less rapidly than the curve showing residential construction. The falling price level has caused a decrease in the production of lumber and the select ratio index as has been noted in connection with the other charts.

In 1922 low prices for building material have brought a rise in both construction lines. Prices did not rise much over the 1921 index. The increase in construction has brought a rise in lumber production and the general condition of lumber dealers is better.

The year 1923 shows a rise in all curves except the select ratio index which has remained at the same level. It is one of the best years for industrial construction after the collapse in 1920 and 1921. In 1924 all five curves move down and the year is sort of a year of general reaction. The reaction in construction we have noted, has resulted in a decline in the demand for lumber and a fall in the price level with the lower select ratio index as a result. The year 1925 has been a boom year for with prices

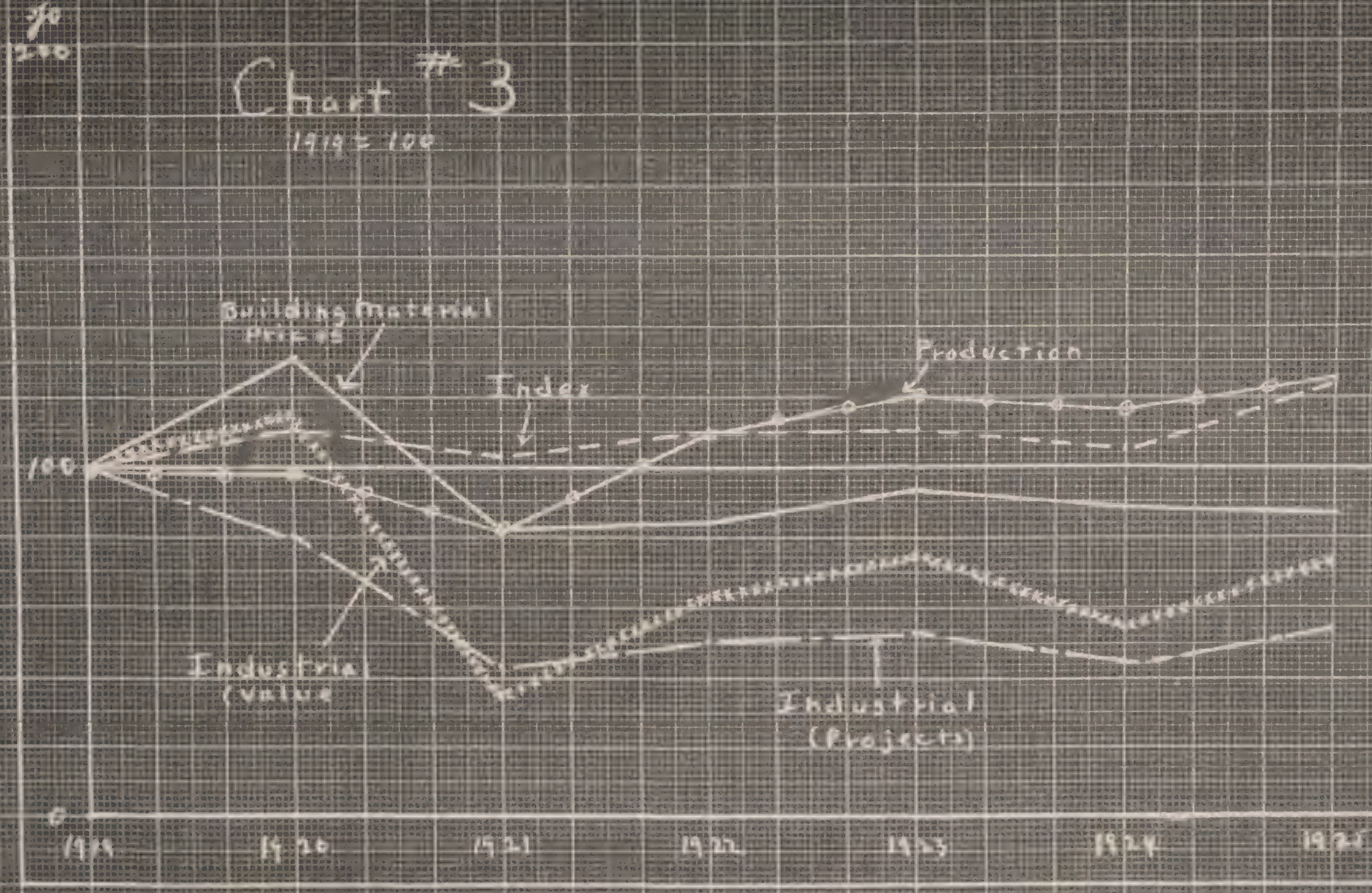

Chart #3

1919 = 100

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being maintained at the low mark construction will increase as will lumber production as will the general level of business shown by the select ratio index.

Conclusions: But the most significant fact shown by the chart is the correlation between the curves for industrial building and the general business index. The industrial building curve is evidently a good indicator of general business conditions within the lumber industry with the exception of the period immediately following the War. The curve of lumber production also follows a curve which correlates pretty well with the curve of general business conditions.

Chart No. 4. This chart also compares lumber production prices for building materials, the select ratio index (or in other words the index of general business conditions) of lumber yards but the construction curves here consist of commercial building.

The year 1920 in commercial building is not at such a high point as the year 1919 for industrial building and consequently the curves are much higher than the curves for industrial building. They are however much lower than the curves for residential building. They coincide more closely with the curves for total construction than with any of the other curves. It has been pointed out that the residential curves have risen much faster and higher. This would be expected but the housing shortage has intensified the situation.

As the charts for total, residential and industrial construction are previously explained no further

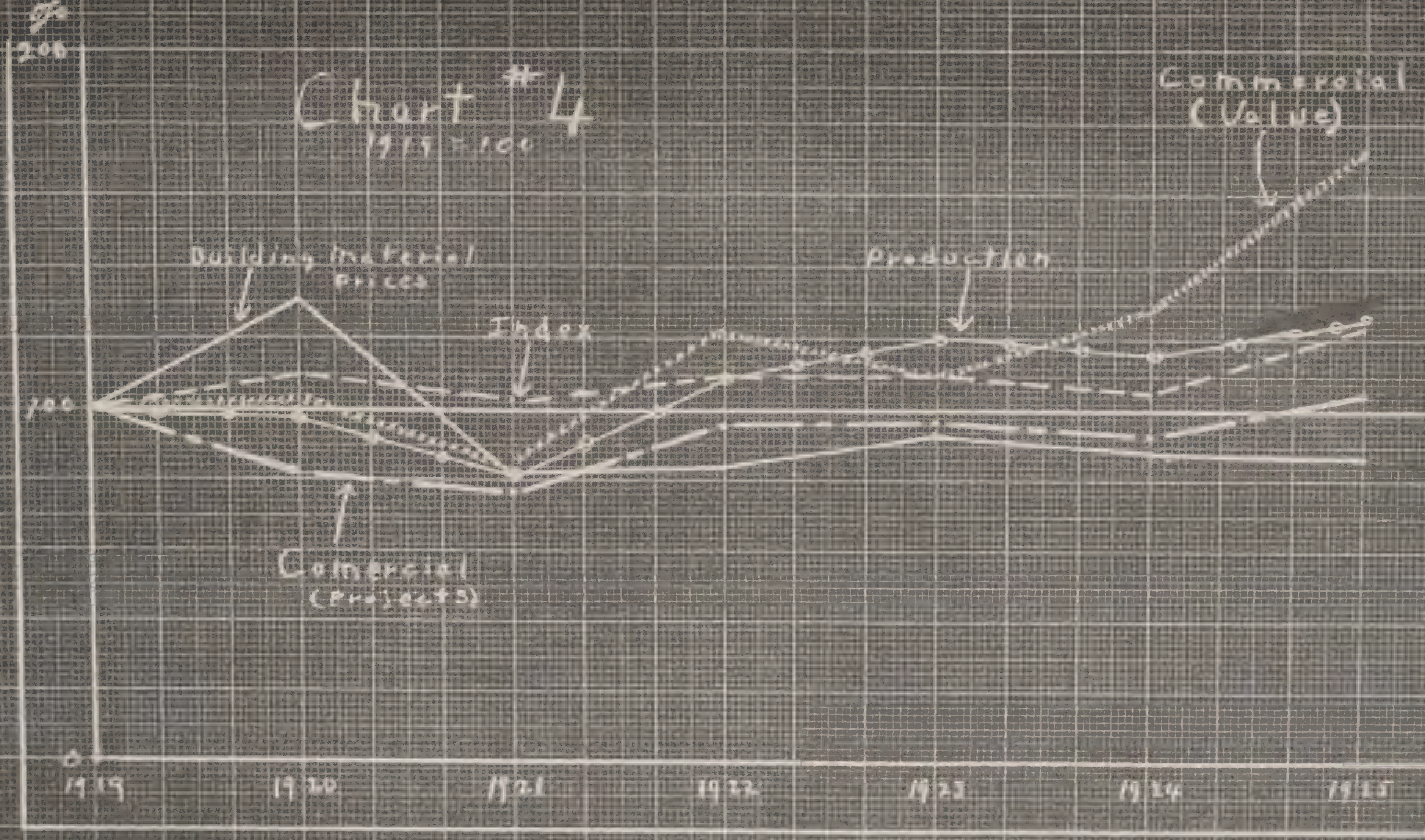

Chart # 4
1919 = 100

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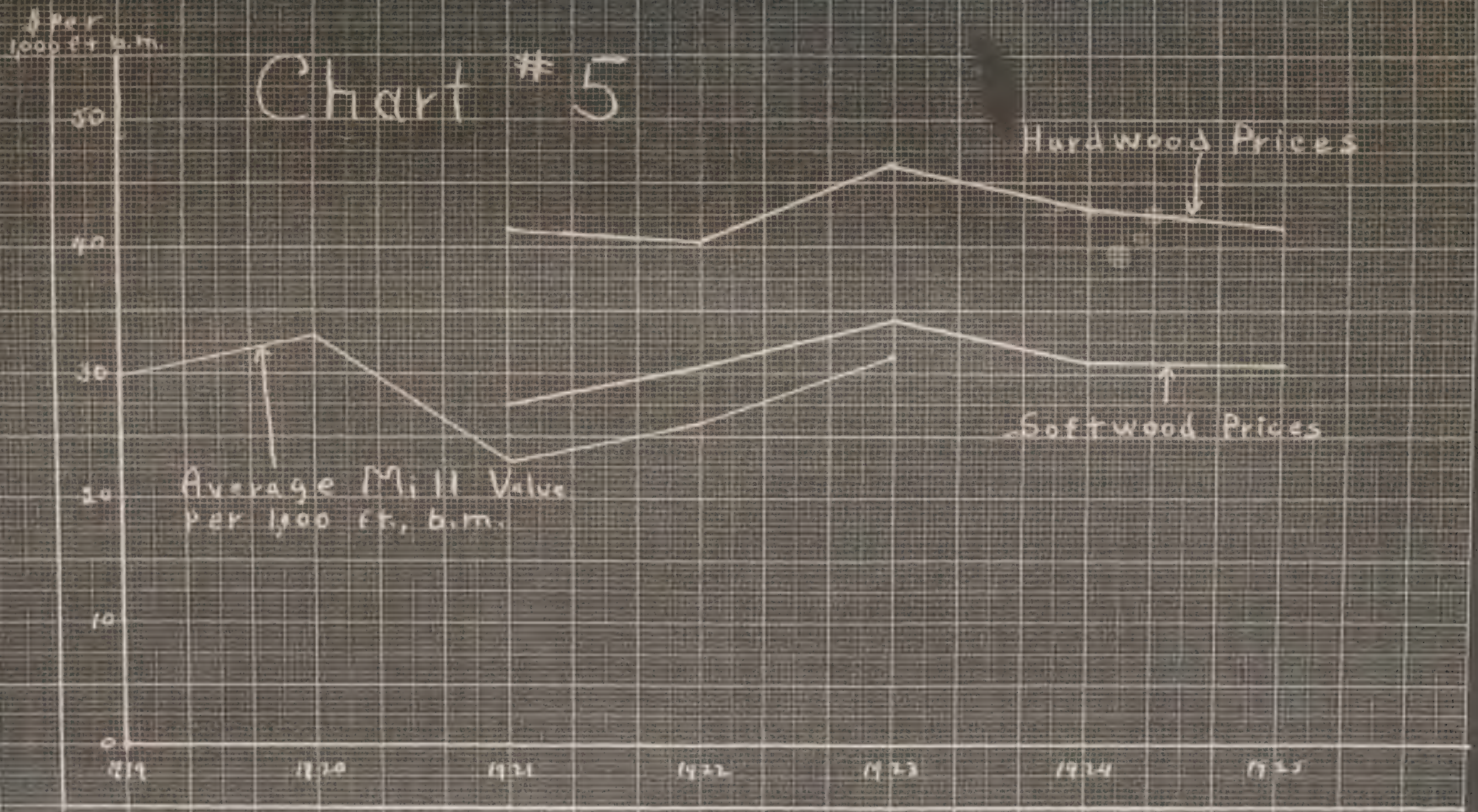
# Chart #5



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explanation will be made in regard to this chart. However, the following conclusions must be noted.

1. Commercial construction has increased more rapidly than industrial construction and consequently does not correlate so well with the index of general business prepared from the select ratios. It moves more closely with total construction.

2. The boom in residential building caused by a housing shortage which was a result of the War has affected the total construction curve so the general business index for lumber yards correlates best with the curve for industrial building.

3. The curve for building material prices indicates what will follow in construction activity and in turn curves for construction activity will precede a rise, or will rise with the index of general business conditions of lumber yards.

TABLE NO. 34. LUMBER PRODUCTION.(1)

| | Board Measure | M. Feet |
|---|---|---|
| 1919 | [illegible] | 130 |
| 1920 | 24,718,500 | 99 |
| 1921 | 20,147,168 | 81 |
| 1922 | 27,246,512 | 109 |
| 1923 | 29,943,132 | 120 |
| 1924 | 29,026,056 | 116 |
| 1925 | 31,425,930 | 126 |

TABLE NO. 35 LUMBER PRICES.(2)

| | Hard Wood | Soft Wood | Total all woods. |
|---|---|---|---|
| 1919 | ------ | ----- | 30.21 |
| 1920 | ------ | ----- | 38.42 |
| 1921 | 41.77 | 27.63 | 33.47 |
| 1922 | 40.79 | 30.63 | 36.15 |
| 1923 | 46.70 | 33.86 | 31.78 |
| 1924 | 42.15 | 30.93 | ----- |
| 1925 | 41.72 | 30.77 | ----- |

TABLE NO. 36 BUILDING MATERIAL PRICES.(3)

1919 = 100
1920 = 131
1921 = 82
1922 = 84
1923 = 94
1924 = 88
1925 = 87

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(1) Survey of Current Business, February 1926 and August 1924.
(2) Statistical Year Book of the United States, 1924.
(3) Survey of Current Business, February 1926 and August 1924.

TABLE NO. 37.

## BUILDING ACTIVITY STATISTICS.[1]

27 Northeastern States.
F. W. Dodge Corporation figures.

| TOTAL | 1919 | 1920 | 1921 | 1922 | 1923 |
|---|---|---|---|---|---|
| No. Projects | 82,342<br>100 | 57,831<br>70 | 78,237<br>95 | 107,062<br>130 | 105,455<br>128 |
| Value (1,000 dollars) | 2,579,881<br>100 | 2,535,224<br>98 | 2,360,189<br>91 | 3,352,657<br>130 | 3,494,118<br>135 |
| **Residential** | | | | | |
| No. Projects | 47,990<br>100 | 28,968<br>60 | 49,418<br>103 | 72,998<br>152 | 71,536<br>149 |
| Value | 849,206<br>100 | 566,125<br>66 | 877,870<br>103 | 1,347,157<br>158 | 1,582,751<br>186 |
| **Industrial** | | | | | |
| No. Projects | 7,637<br>100 | 6,137<br>80 | 3,288<br>43 | 3,876<br>51 | 4,051<br>53 |
| Value | 512,924<br>100 | 588,965<br>115 | 173,316<br>34 | 325,000<br>63 | 378,815<br>74 |
| **Commercial** | | | | | |
| No. Projects | 13,103<br>100 | 10,752<br>82 | 10,129<br>77 | 12,636<br>96 | 12,715<br>97 |
| Value | 405,666<br>100 | 419,653<br>103 | 338,328<br>83 | 496,300<br>122 | 446,124<br>110 |

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(1) Taken from reports of the F. W. Dodge Corporation figures from 1919-24 inclusive and from the Statistical Year Book of the U. S. for 1924-1925 figures from current issues of the Graphic Review. 1919-24 statistics from Statistical Year Book because they were presented there in the form wanted for the report.

| 1924 | 1925 |
|---|---|
| 109,032 | 135,108 |
| 132 | 160 |
| 3,879,538 | 5,041,937 |
| 150 | 196 |
| 77,713 | 93,455 |
| 162 | 195 |
| 1,842,143 | 2,280,100 |
| 217 | 268 |
| 3,465 | 4,165 |
| 45 | 54 |
| 285,137 | 374,636 |
| 55 | 73 |
| 12,172 | 16,660 |
| 83 | 104 |
| 592,244 | 793,175 |
| 132 | 178 |

TABLE NO. 38.

1919 (1919 = 100) LUMBER VALUES. SELECT RETAIL LUMBER

| 1919<br>BASE | 1920<br>RATIO | WT. | REL. | VALUE |
|---|---|---|---|---|
| 169 | 232 | 25 | 127 | 31.75 |
| 167 | 146 | 9 | | |
| 259 | 111 | 15 | 69 | 10.35 |
| 172 | 204 | 25 | 116 | 29.00 |
| 751 | 1,000 | 10 | 125 | 12.50 |
| 406 | 489 | 10 | 106 | 10.60 |
| 548 | 566 | 10 | 104 | 10.40 |
| 258 | 317 | 5 | 119 | 5.95 |
| 100 | | TOTAL. | | 110.55 |

| 1921<br>RATIO | REL. | VALUE |
|---|---|---|
| 219 | 123 | 30.75 |
| 160 | 0 | |
| 156 | 60 | 9.00 |
| 348 | 131 | 32.75 |
| 760 | 101 | 10.10 |
| 386 | 95 | 9.50 |
| 385 | 70 | 7.00 |
| 235 | 91 | 4.55 |
| | | 103.65 |

1922

| RATIO | REL. | VALUE |
|---|---|---|
| 138 | 128 | 32.00 |
| 177 | 0 | |
| 196 | 76 | 11.40 |
| 256 | 134 | 33.50 |
| 669 | 89 | 8.90 |
| 410 | 104 | 10.40 |
| 553 | 101 | 10.10 |
| 194 | 75 | 3.75 |
| | | 110.05 |

1923

| RATIO | REL. | VALUE |
|---|---|---|
| 236 | 129 | 32.25 |
| 116 | 0 | |
| 211 | 81 | 12.15 |
| 261 | 139 | 34.75 |
| 646 | 86 | 8.60 |
| 402 | 99 | 9.90 |
| 479 | 87 | 8.70 |
| 192 | 74 | 3.70 |
| | | 110.05 |

1924

| RATIO | REL. | VALUE |
|---|---|---|
| 246 | 132 | 33.00 |
| 132 | 0 | |
| 195 | 76 | 11.40 |
| 276 | 138 | 34.50 |
| 523 | 70 | 7.00 |
| 386 | 95 | 9.50 |
| 374 | 68 | 6.80 |
| 168 | 65 | 3.25 |
| | | 105.45 |

1925

| RATIO | REL. | VALUE |
|---|---|---|
| 372 | 155 | 38.75 |
| 109 | 0 | 0 |
| 307 | 116 | 17.40 |
| 389 | 156 | 39.00 |
| 483 | 64 | 6.40 |
| 381 | 93 | 9.30 |
| 555 | 101 | 10.10 |
| 176 | 68 | 3.40 |
| | | 124.35 |

TABLE NO. 39.

## BUILDING TRADES.

### Union rates of wages per hour.

(1913 = 100)

| | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 |
|---|---|---|---|---|---|---|
| Building Laborers | 156 | 226 | 228 | 214 | 218 | 242 |
| Carpenters | 146 | 195 | 193 | 183 | 204 | 218 |
| Cement Finishers | 135 | 183 | 186 | 175 | 191 | 211 |
| " " Helpers | 141 | 226 | 226 | 217 | 223 | 243 |
| Hod Carriers | 160 | 232 | 236 | 197 | 215 | 255 |
| Inside Wiremen | 146 | 192 | 202 | 190 | 197 | 221 |
| Lathers | 132 | 189 | 192 | 181 | 199 | 215 |
| Painters | 151 | 206 | 213 | 199 | 219 | 231 |
| Plasterers | 131 | 171 | 180 | 174 | 193 | 216 |
| Plumbers & Gas Fitters | 133 | 172 | 181 | 168 | 186 | 202 |
| Bricklayers | 128 | 173 | 173 | 160 | 191 | 202 |

Note - These figures were obtained from the Statistical Year Book for 1924, page 310. They are based on data obtained in the principal cities of the United States. The relative wages are percentages which indicate the change in wages per hour. The figures are based on the scale prevailing May 15, each year.

Analysis of the "X" Lumber Company: In Chapter five methods were explained by which an individual company could be compared to the group and several different companies were compared with group one figures to show what results could be obtained by using such methods. But these comparisons were made for only one year, the year 1925. So in order to make further use of the index method of comparison statements were secured for the "X" Lumber Company of Iowa. The statements which were received from a broker were placed upon the Robert Morris Associates forms, the eight ratios worked for each year and 100% statements prepared. These were placed upon a form beside the figures of the combined lumber yard statements that have been referred to several times before in this Chapter. An index was prepared for the Lane-Moore Company each year using the select ratios of the group figures for a base and wherever the base ratio was smaller the formula of [illegible] x 100 - $\frac{\text{base}}{\text{Individual}}$ = "rel."

Results of the Analysis: Let us now turn to Table No. 40 and look at the index which has been prepared and see how the Lane-Moore Company has checked up with group figures during the seven year period. The year 1919 was a bad year for lumber companies according to the index which was computed when the select ratios for 1919 were used as a base as no time during the period did this index go as low as 100. It will be noticed that in 1919 the X Company is much better than the

group for the index figure stands at 137.45%. A glance at the 100% statements shows that that is caused by a very good current position due to a large proportion of receivables. It will be noticed that this has been the case in practically every year as only in one year was the Merchandise-Receivable ratio over 100%. Evidently the terms of sale are different in this company or the collection policy has been poor. This same thing is pointed out by the Sale-Receivable ratio which has a relationship to the select ratio varying between 22 and 41.

In the year 1920 there is a slight drop in the X index but the index is still much above 100 and as it would indicate that the Company has been well managed. There have been no important changes in conditions since 1919.

The year 1921, a year which was represented as the worst year for the combined companies by use of 1919 as a base is represented as one of the best years for the X Company. This is true in spite of the fact that sales have fallen from 136.[illegible]% of total assets in the year 1920 to 79.89% of total assets in the year 1921. It is again evidence of the fact that the company has been well managed. The fact that the company has been well managed is again shown to be true by the 100% statement for the company has decreased its payables from 12.90% to 7.90% and has at the same time maintained about the same proportion in current assets.

In 1922 the index figure at 135 is at its peak. This has been caused by an unusually high current position and receivables have amounted to 51.02% of total assets. While the index figure shows the company to be much better than

the average it seems that such a large amount of receivables is too large considering that the year 1922 was a year of revival as indicated by our construction curves and by the index prepared when 1919 was used as a base. The Company is evidently well above normal but the index figure in this case considered in the light of the 1922 statement will be somewhat reduced.

1923 shows a drop of 11.75% in the index figure in spite of the fact that sales have increased over the year 1922 as to percentage of total assets. The current ratio has fallen to 719 and has approached more of a normal position as in 1922 the current ratio was very far out of line with what might ordinarily be expected. This has been the reason for the fall in the index. If the formula had not been used the abnormal current ratio would have thrown the index still further out of line. Nevertheless, it can be said that the X Lumber Company is still in a much better condition than the group.

1924 shows the X Lumber Company index figure at 103.38%, the lowest point that it has reached. We have previously noted in our discussion that 1924 was a year of reaction and that a fall in the index would be expected in this year. However, as the index is still 3.38% above normal there need be no reason for alarm.

The year 1925 shows the X Lumber Company to be far below normal. In comparing 1925 with previous years it must be remembered however, that select ratios for this year have been prepared from a group of fifty retail lumber dealers and that in previous years the groups have

contained both retail and wholesale yards. If it had been possible to secure the same fifty statements or a similar group of fifty statements for each year the break in the index would probably not be as great as is shown here. But the only conclusion we can draw in regard to the credit standing of the "X" Company in 1925 is that it has fallen much below normal and that this condition is a result of its failure to improve in the same proportion that improvement has been shown in the fifty companies of the group. Index figures and 100% statements are given in the following tables. Another thing that must be considered is that in this year, as well as in all of the other years the percentage of sales to total assets is much below the percentage of sales to total assets for the group.

## TABLE NO. 40

## RETAIL LUMBER YARD - THE X LUMBER COMPANY OF IOWA.

| | 1919 | | | 1920 | | |
|---|---|---|---|---|---|---|
| ASSETS | | 100% Statements | | | 100% Statements | |
| | | Co. | Group | | Co. | Group |
| Cash | 38,480 | 6.05 | 2.39 | 32,680 | 4.67 | 3.78 |
| Receivables | 299,056 | 47.07 | 21.01 | 353,770 | 50.54 | 17.86 |
| Inventory | 162,508 | 25.58 | 38.02 | 169,899 | 24.27 | 37.30 |
| Listed Securities | 5,250 | .83 | 2.38 | 7,850 | 1.12 | .87 |
| Miscellaneous | | | .59 | | | 1.18 |
| Total Current | 505,294 | 79.54 | 64.39 | 564,199 | 80.60 | 60.99 |
| Plant and Equipment | 117,686 | | | 117,205 | 16.74 | |
| Miscellaneous | 12,255 | | | 18,584 | 2.66 | |
| Total Fixed | 129,941 | 20.46 | 35.61 | 135,789 | 19.40 | 39.01 |
| Good Will | | | | | | |
| Total Fixed | | | | | | |
| Treasury Stock | | | | | | |
| TOTAL | 635,235 | 100.00 | 100.00 | 699,988 | 100.00 | 100.00 |
| LIABILITIES | | | | | | |
| Payables | 117,600 | 18.51 | 27.61 | 132,700 | 18.96 | 22.06 |
| Taxes | 5,000 | .78 | 1.11 | | | 1.15 |
| Miscellaneous | | | 2.21 | | | 3.80 |
| Total Current | 122,600 | 19.29 | 30.93 | 132,700 | 18.96 | 27.01 |
| Funded | | | 1.98 | | | 1.58 |
| Total Debt | 122,600 | 19.30 | 32.91 | 132,700 | 18.96 | 28.59 |
| Reserves | 69,387 | 10.93 | 2.37 | 75,078 | 10.72 | 3.51 |
| Capital Stock | | | | | | |
| Surplus | | | | | | |
| Net Worth | 443,248 | 69.77 | 64.72 | 492,210 | 70.32 | 67.90 |
| TOTAL | 635,235 | 100.00 | 100.00 | 699,988 | 100.00 | 100.00 |
| Sales | 827,524 | 130.27 | 180.73 | 953,965 | 136.28 | 181.26 |

RATIOS AND INDEX

| | Wt. | Co. | Group | Rel. | Value | Co. | Group | Rel. | Value |
|---|---|---|---|---|---|---|---|---|---|
| Current | 25 | 412 | 169 | 159 | 39.75 | 425 | 232 | 146 | 36.50 |
| Mdse.-Rec. | 1 | 54 | 167 | | | 48 | 166 | | |
| Worth-Fixed | 15 | 341 | 259 | 125 | 18.75 | 362 | 181 | 150 | 22.50 |
| Worth-Debt | 25 | 361 | 172 | 153 | 38.25 | 370 | 204 | 145 | 36.25 |
| Sales-Rec. | 10 | 276 | 751 | 36 | 3.60 | 269 | 1,000 | 27 | 2.70 |
| Sales-Mdse. | 10 | 509 | 406 | 121 | 12.10 | 561 | 429 | 124 | 12.40 |
| Sales-Fixed | 10 | 636 | 548 | 114 | 11.40 | 702 | 566 | 120 | 12.00 |
| Sales-Worth | 5 | 186 | 258 | 72 | 3.60 | 194 | 317 | 61 | 3.05 |
| INDEX | | | | | 127.45 | | | | 125.40 |

| | 1921 | | | 1922 | | | 1923 | |
|---|---|---|---|---|---|---|---|---|
| | 100% Statements | | | 100% Statements | | | 100%Statements | |
| | Co. | Group | | Co. | Group | | Co. | Group |
| 36,499 | 6.15 | 2.79 | 16,109 | 2.90 | 2.49 | 34,593 | 5.88 | 3.66 |
| 278,082 | 46.80 | 16.77 | 283,410 | 51.02 | 18.29 | 232,549 | 39.50 | 22.39 |
| 134,002 | 22.55 | 26.98 | 120,155 | 21.63 | 24.62 | 180,813 | 30.72 | 29.17 |
| 92.50 | 1.55 | 1.38 | | | 1.36 | | | 1.53 |
| | | .20 | | | .20 | | | 1.40 |
| 457,833 | 77.04 | 48.12 | 419,674 | 75.55 | 46.96 | 447,955 | 76.10 | 58.15 |
| 119,011 | 20.03 | | 119,157 | 21.45 | | 124,087 | 21.08 | |
| 17,383 | 2.93 | | 16,616 | 3.00 | | 16,572 | 2.81 | |
| 136,394 | | 51.88 | 135,773 | 24.45 | 53.04 | 140,659 | 23.90 | 41.85 |
| 594,227 | 100.00 | 100.00 | 555,447 | 100.00 | 100.00 | 588,614 | 100.00 | 100.00 |
| 46,865 | 7.89 | 18.05 | 23,406 | 4.21 | 18.53 | 61,915 | 10.52 | 21.16 |
| | | .58 | | | .65 | | | .84 |
| 99 | .01 | 2.97 | 118 | .02 | .93 | 383 | .06 | .87 |
| 46,964 | 7.90 | 21.60 | 23,524 | 4.23 | 20.11 | 62,298 | 10.58 | 22.87 |
| | | 3.69 | | | 3.27 | | | 3.19 |
| 46,964 | 7.90 | 25.29 | 23,524 | 4.23 | 23.38 | 62,298 | 10.58 | 26.06 |
| 75,057 | 12.63 | 3.22 | 75,056 | 13.51 | 1.87 | 89,206 | 15.15 | 2.53 |
| 472,206 | 79.47 | 71.49 | 456,867 | 82.26 | 74.75 | 437,110 | 74.27 | 71.41 |
| 594,227 | 100.00 | 100.00 | 555,447 | 100.00 | 100.00 | 588,615 | 100.00 | 100.00 |
| 474,760 | 79.89 | 138.19 | 463,434 | 83.43 | 144.13 | 534,907 | 90.87 | 149.58 |

| Wt. | Group | Rel. | Value | Co. | Group | Rel. | Value | Co. | Group | Rel. | Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 974 | 219 | 178 | 44.50 | 1784 | 233 | 187 | 46.75 | 719 | 236 | 168 | 42.00 |
| 48 | 160 | | | 42 | 107 | | | 77 | 116 | | |
| 346 | 156 | 155 | 23.25 | 336 | 198 | 142 | 21.30 | 310 | 211 | 132 | 19.80 |
| 1005 | 248 | 176 | 44.00 | 1942 | 258 | 187 | 46.75 | 701 | 281 | 160 | 40.00 |
| 170 | 760 | 22 | 2.20 | 163 | 669 | 24 | 2.40 | 230 | 646 | 35 | 3.50 |
| 354 | 386 | 92 | 9.20 | 385 | 419 | 91 | 9.10 | 295 | 402 | 73 | 7.30 |
| 348 | 385 | 90 | 9.00 | 341 | 553 | 61 | 6.10 | 364 | 479 | 75 | 7.50 |
| 101 | 235 | 42 | 2.10 | 101 | 194 | 52 | 2.60 | 122 | 192 | 63 | 3.15 |
| | | | 134.25 | | | | 135.00 | | | | 123.25 |

| 1924 | | | 1925 | | |
|---|---|---|---|---|---|
| | 100% Statements | | | 100% Statements | |
| | Co. | Group | | Co. | Group |
| 17,422 | 2.76 | 3.26 | 14,873 | 2.27 | 4.93 |
| 221,529 | 35.17 | 21.92 | 231,294 | 35.26 | 31.37 |
| 229,604 | 36.45 | 27.25 | 224,664 | 34.25 | 36.49 |
| | | .49 | | | |
| | | .68 | | | |
| 468,555 | 74.38 | 53.60 | 470,831 | 71.78 | 72.79 |
| 143,245 | 22.74 | | 166,394 | 25.36 | |
| 18,136 | 2.88 | | 18,796 | 2.86 | |
| 161,381 | 25.62 | 46.40 | 185,190 | 28.22 | 27.21 |
| 629,936 | 100.00 | 100.00 | 656,021 | 100.00 | 100.00 |
| 119,650 | 18.99 | 20.67 | 153,037 | 23.33 | 16.40 |
| | | .55 | | | .15 |
| | | 1.61 | | | 1.23 |
| 119,650 | 18.99 | 22.83 | 153,037 | 23.33 | 17.78 |
| | | 2.00 | | | 1.18 |
| 119,650 | 18.99 | 24.83 | 153,037 | 23.33 | 18.96 |
| 87,556 | 13.90 | 4.89 | 93,730 | 14.29 | 2.00 |
| 422,730 | 67.11 | 70.28 | 409,254 | 62.38 | 79.04 |
| 619,936 | 100.00 | 100.00 | 656,021 | 100.00 | 100.00 |
| 501,761 | 79.65 | 109,83 | 540,178 | 82.34 | 151.77 |

| Co. | Group | Rel. | Value | Co. | Group | Rel. | Value |
|---|---|---|---|---|---|---|---|
| 391 | 246 | 138 | 34.50 | 307 | 372 | 82 | 20.50 |
| 103 | 122 | | | 97 | 109 | | |
| 262 | 198 | 125 | 18.75 | 221 | 307 | 72 | 10.80 |
| 353 | 276 | 122 | 30.50 | 267 | 389 | 68 | 17.00 |
| 226 | 623 | 43 | 4.30 | 233 | 483 | 48 | 4.80 |
| 218 | 388 | 56 | 5.60 | 240 | 381 | 62 | 6.20 |
| 310 | 374 | 82 | 8.20 | 291 | 555 | 52 | 5.20 |
| 118 | 168 | 70 | 3.50 | 132 | 176 | 75 | 3.75 |
| | | | 105.35 | | | | 68.25 |

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